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A STUDY OF THE EFFECTIVENESS OF TRAINING FOR RETARDED READERS IN THE AUDITORY PERCEPTUAL SKILLS UNDERLYING READING.

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TWO STUDIES WERE CONDUCTED TO EXPLORE THE RELATIONSHIP BETWEEN THE AUDITORY SKILLS OF SOCIALLY DISADVANTAGED STUDENTS AND READING ACHIEVEMENT. THE EFFECT OF A DEVELOPMENTAL AUDITORY TRAINING PROGRAM ON READING ACHIEVEMENT AND THE EFFECTIVENESS OF DIFFERENT EVALUATIVE PROCEDURES FOR AUDITORY PERCEPTUAL SKILLS WERE ALSO TESTED. SIXTY-FOUR THIRD-GRADE NEGRO AND PUERTO RICAN CHILDREN WHO WERE RETARDED READERS WERE CHOSEN AS SUBJECTS. THREE TREATMENT GROUPS AND ONE CONTROL GROUP WERE SET UP. THE THREE TREATMENT GROUPS RECEIVED VARYING COMBINATIONS OF AUDITORY AND READING TRAINING. THERE WERE 50 TREATMENT SESSIONS. TESTS WERE ADMINISTERED PRIOR TO THE TREATMENT, IMMEDIATELY FOLLOWING THE TREATMENT, AFTER 6 MONTHS, AND AFTER A YEAR. RELIABILITY COEFFICIENTS, ANALYSIS OF COVARIANCE, INTERCORRELATIONS, AND T TESTS WERE USED TO ANALYZE THE DATA. NO TREATMENT GROUP FACILITATED READING ACHIEVEMENT. THERE WERE NO GROUP DIFFERENCES. NONE OF THE VARIOUS COMBINATIONS OF READING AND AUDITORY PROGRAMS SEEMED TO AFFECT IMPROVEMENT IN READING. IT WAS SUGGESTED THAT THERE MIGHT BE INTERRELATIONSHIPS OF TEACHER AND PUPIL VARIABLES IMPORTANT IN READING LEARNING. STAFF EVALUATIONS, REFERENCES, ADDITIONAL RESULTS, TABLES, DESCRIPTIONS OF TESTS, AND APPENDIXES ARE INCLUDED. (BK)

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Title VII Project No. 1127

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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A Study of the Effectiveness of Training for Retarded Readers In the Auditory Perceptual Skills Underlying Reading

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Introduction

Two studies are included in this report. Study I, which was the original study funded by the U.S. Office of Education, is described in Chapters I through VI. Study II was undertaken during the second year of Study I. The staff felt at the conclusion of the treatment period of Study I that certain modifications in the design might bring greater gains in reading achievement. For that reason, supplementary funds were obtained to carry out an additional but smaller study. Study II is described in Chapters VII through IX. Chapter X gives general conclusions from both of the studies.

I

The Problem--Study I

The role of auditory perceptual skills in early reading learning has become the focus of renewed research attention since studies have been undertaken of learning disabilities of socially disadvantaged children. Educators repeatedly point out the auditory perceptual deficiences that usually accompany reading retardation with such a group of children. Yet little seems to be known about ways of dealing with such deficiencies in an educational setting.

The present study was an exploration of the relationship between auditory skills and reading achievement in children from socially disadvantaged backgrounds. There is some established research evidence to indicate the nature of that relationship. Most of the reported studies substantiated the existence of a positive relationship between auditory and reading skills; the results of those studies are summarized below.

Several studies showed that auditory skills increase with age, that is, that the skills are developmental. Kennedy (1942), studying children between the ages of six and fifteen years, showed a clear developmental change with age in auditory acuity and auditory discrimination. Thompson (1961) found that only 29.5% of the first graders, as compared with 76.2% of the second graders, had adequate auditory discrimination ability. Wepman (1960) concluded that with increasing age, fewer children showed auditory discrimination problems. Midgeley (1957) reported an increase in auditory ability with age.

There is good evidence that a positive relationship between auditory and reading skills exists for the younger children, that is, for children in grades one through three. In Crossley's study (1948), the children, age six years 10 months, who had high auditory ability had higher scores on the Gates Reading tests than did those with low auditory ability. Sister Harrington and Donald Durrell (1955) concluded that auditory and visual discrimination were important for a second-grade sample in acquiring primary reading vocabulary. Sister Nila (1953), using first graders, investigated the relationship of twelve factors, including such diverse factors as home background, personality, kindergarten training, language ability, intelligence, sex and auditory and visual discrimination, to reading achievement. She concluded that auditory discrimination had the strongest relation to reading achievement.

Other studies also gave evidence of a relationship between the skills in the early grades. Thompson (1961) stated that auditory discrimination correlated highly with reading succes on the first and second grade level. Bond (1935), in a study of good and poor readers, found significant score differences for them on four of his six auditory measures on the second-and third-grade level. Wepman's results (1960) with first-and second-graders indicated that the children with poor auditory discrimination were more likely to be poor readers.

Two studies showed the relation of auditory training to reading achievement. Duggins (1956) who gave auditory training to six-year-olds prior to reading instruction, showed that use of auditory training did promote readiness for first grade reading. Murphy (1943) used three experimental groups, those receiving auditory training, a visual training group, and an auditory and visual training group. All were superior to the control group in reading achievement at all times of the testing.

In summary, there is some evidence showing a relationship between reading and auditory abilities in the early grades. In addition, there is evidence that auditory programs do promote reading achievement in the early grades.

By contrast, the studies dealing with older children showed no consistent relationship between reading and auditory skills. Poling's results (1953) with children aged 8 years to 13 years indicated that auditory acuity and auditory discrimination were not related to inefficient word recognition, but that auditory memory span might be. Reynolds (1953), correlating five reading measures and eight auditory skills of fourth-grade children, found few relationships between the auditory and reading skills.

In addition, Wheeler and Wheeler (1954) found significant correlations between discrimination and reading in fourth-to sixth-graders, but since the correlations ranged from .31 to .40, they doubted that any substantial relationship between the two skills existed. Wolfe (1941) compared average readers and retarded readers, aged 8 years 11 months to 9 years 11 months. The retarded readers had significantly lower scores on only one of the three auditory measures. Ewers (1950) correlated high school students' scores on two reading tests with 42 auditory tests, and found the correlations to be low, with a few exceptions. Goetzinger et al. (1960) were able to differentiate between good and poor readers, aged 10 years to 13 years, on two of the threeauditory measures, again showing inconsistent relationships of auditory skills with reading among older children.

In summary, the above studies of older children generally show a less strong or inconsistent relationship between auditory and reading skills as compared to studies using younger children. There seems to be some evidence therefore, that the relationship might be a differential one with age, it being strongest in the early school years. Thus, there may be a time during which auditory skills are maximally related to reading skills, i.e., in the early grades when reading skills are being taught. Any deficit in auditory skills at that point, then, might affect subsequent development of reading skills, with the result that the relationship would be prolonged. In other words, immature development of auditory skills might lengthen the period of maximum relationship of auditory and reading skills, to the detriment of the learning of reading skills.

The studies of Rizzio (1939) and Katz and Deutsch (1963) give support to those conclusions. Those investigators used a wider range of ages than did the studies reported above, thus making possible a direct comparison of the auditory and reading scores for the different ages. Rizzio concluded that memory span might be a contributing factor in reading retardation, especially for the younger children in his study. In the Katz and Deutsch study, the auditory discrimination measures differentiated good and poor readers on the first - third-and fifth-grade levels, but differentiated the groups best on the first-grade level. However, there still was significant differentiation on the fifth-grade level. The authors suggested, on the basis of the data, that good readers may be functioning on a higher developmental level perceptually than the poor readers in the study.

Thus, it may be that the performance of the poor readers, as related to the good readers, may parallel the performance of younger children as compared to older ones, with the possibility that auditory perceptual deficits, or immaturity, may be a factor in reading deficiencies.

Investigation of auditory skills within the framework of environmental background seems particularly important because of the high incidence of reading disability among children from socially disadvantaged neighborhoods. Reading disabilities for such a child may be closely tied to early auditory perceptual deficiencies.

Deutsch (1962) has proposed that the home background of the socially disadvantaged child is particularly conducive to producing children with auditory deficiencies. She argues that with confusing auditory stimuli present in the home, some auditory stimulation could be expected to be tuned out. If those stimuli were unpleasant, a learned inattention could result.

In addition, she argues that if there were little directed and sustained speech stimulation for the child, and if only sporadic efforts were made to focus the child's attention on auditory stimuli, the child might well become deficient in recognition and discrimination of sounds. Therefore the higher incidence of reading retardation reported among socially disadvantaged children (Miller et al. 1957) may be due in part to early deficiency in auditory skills.

In summary, it has been suggested that early environmental background may hinder the development of auditory perceptual skills, and therefore hinder reading learning. If the effects of auditory deficiencies could be minimized by training, then reading learning might also be facilitated.

Two types of studies could evolve from such assumptions. The first type could attempt to ameliorate auditory deficiencies in pre-school children to ascertain what effect auditory learning might have on later reading learning in the first-grade. The second type of study, which is the approach taken by the present study, has a corrective approach. It proposes to investigate the relationship of auditory and reading skills in the retarded reader in the primary grades with the aim of ameliorating auditory deficiencies at that age. If the assumptions concerning the relationship of auditory and reading skills are valid, the retarded reader might still have developmental auditory skill deficiencies usually seen in the younger child. It is reasonable to assume, then that the limits of the time for optimum relationship may not have been reached with the retarded reader. If this were so, it might be assumed that the relationship between auditory and reading skills could be modified, so that increase in auditory skills would bring direct benefit to the reading learning going on at that time. Therefore, it was assumed that a developmental program of auditory skills for young retarded readers should facilitate their reading relearning.

There is little in the literature to suggest the nature of the developmental auditory program that might help to test the above assumptions. Other work with socially disadvantaged retarded readers (Graff and Feldmann, 1965) suggests that an organized program which teaches spcific skills found related to reading might be best. It was the thinking of the investigators that the use of a special program for developmental training in auditory perceptual skills ought to provide a systematic framework for acquisition of skills related to reading, especially for the socially disadvantaged child who has been subjected to little organization in auditory skills. With such a framework, the task of transfer of the auditory skills to reading learning might be facilitated.

The present study, then, attempts to test the assumptions of a relationship between auditory and reading skills in the primary-grade retarded reader, to see what effect developmental auditory training might have on reading relearning. Third-grade children were selected for two reasons:

1. that age falls within the age range for optimum relationship between reading and auditory skills,

2. by third-grade retarded readers could be differentiated from slow learners with some certainty.

In addition, the effects of an auditory program on reading over time were investigated, since it was possible there would be long-term effects rather than immediate effects.

The specific hypothesis for the study was that the use of a developmental auditory training program for socially disadvantaged young retarded readers facilitates reading retraining, with resultant increase in reading achievement scores both immediately after the training program and after a year's time.

Several subsidiary aims were also outlined for the study. The first was to look more closely at the interrelationships of auditory and reading skills, since little of the known evidence for the relationships had been drawn from socially disadvantaged samples.

The second aim was to determine the relative effectiveness of different evaluation procedures for auditory perceptual skills. Since there were few tests available for determining auditory perceptual skills, some exploration of those constructed from the study would be necessary. It was also planned to analyze the reading tests in some detail to see whether additional information about possible reading improvement among the children might be gained from them.

A third subsidiary aim was to evaluate the auditory curriculum to determine whether it was usable and/or effective with socially disadvantaged children.

II

Design and Procedure

Design

The present study was designed to determine whether training in auditory perceptual skills would facilitate reading retraining among young retarded readers from low socioeconomic schools. Three training groups were organized to receive varying combinations of reading and auditory training. A control group was also used. The treatment combinations were: reading alone, auditory training alone, and a group receiving successively both reading and auditory training. In order to control the time spent with a tutor, the auditory-only and the reading-only groups received time in play sessions equal to the additional training time of the dual treatment group.

A total of 16 groups was necessary to insure that an equal number of children received each treatment. Three to four children comprised a treatment group. Each of the four tutors worked with group representing all three treatment categories.

The time of day at which instruction was given was controlled by assigning each type of group to each of the four possible appointment times during the day.

Batteries of auditory and reading tests were given to the subjects before and after the five-month treatment period. The post- tests were administered three times, once immediately following the treatment period, once after a six-month interval and again after a 12-month interval, in order to ascertain any long-term modifications in reading and auditory skills, or in their possible interrelationships. More specific procedural information is given below. Table 1 shows the design of the study.

Table 1

Design of Study I

Time	Treatment Groups			
	Auditory-Play	Reading-Play	Reading-Auditory	Control
Dec. 1963 - Jan. 1964	Pre-tests	Pre-tests	Pre-tests	Pre-tests
Jan. 1964 - May 1964	Auditory Prog.		Auditory Prog.	
		Reading Prog.	Reading Prog.	
	Play	Play		
May 1964 - June 1964	Post-test I	Post-test I	Post-test I	Post-test I
Nov.1964 - Dec. 1964	Post-test II	Post-test II	Post-test II	Post-test II
May 1965 - June 1965	Post-test III	Post-test III	Post-test III	Post-test III

Sample Selection

For the initial screening, the Gates Primary Reading Test, Paragraph Reading, Form I (Gates PPR), was administered to 523 third grade children in five schools in low socioeconomic neighborhoods. These children comprised most of the third grade population in these schools. In most of the schools the top- and bottom-ranked third grade classes were not tested, since the probability was that children in these classes would score either too high or too low to be selected for the sample.

A reading score of 2.4 was used as a cut-off score for subject selection. Children scoring at that level and below were considered sufficiently retarded in reading for the study.[1]

The 321 children who scored 2.4 or lower on the Gates PPR were investigated further by means of conferences with guidance counselors and classroom teachers in the five schools. Any child exhibiting one or more of the following characteristics was eliminated from further consideration:

1. Below 80 IQ (on a school-administered group intelligence test such as the Otis Quick Scoring test or Pinter-Cunningham test)
2. Acting-out behavior problems
3. Marked speech impairment or non-English speaking (Bilingual children were included in the sample if they were judged by the school to speak English fluently.)
4. Hearing deficiency (determined by school-administered acuity test)
5. Visual deficiency (if not corrected by glasses)
6. Gross neurological or health impairment (teacher and school records)
7. Already receiving remedial reading tutoring

In addition, the children were asked whether their families had any plans to move in the near future.

On the basis of the teacher conferences, the above criteria, and the obtaining of parental consent, 64 children were selected. Despite the screening devices, three of the sixty-four children were eliminated, as they were found to be severe behavior problems. Because of the mobility of families the N was reduced to 57 at the time of the first posttesting and to 47 at the time of the second posttesting. At the third and final posttesting 45 of those 47 children were located and tested.

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[1] The cut-off score was determined by use of the standard error of measure for the test; a 2.4 reading grade score is significantly lower than a score of 3.0, which would be considered an average reading grade for the sample in the study.

On the basis of their performance on the group and individual reading tests, and to some extent on the basis of school IQ and personality (as judged by the tester), groups of three to four children were formed. Each of these groups was then randomly assigned to a treatment or control group.

Testing

There were five individually administered batteries of reading and auditory tests. Batteries III and IV were balanced for type of test and length of administration.

The following tests, which are described in a later section, were given to each child, always in the same order.

List of Tests by Battery

Battery	Test
Battery I	1. Gates Primary Reading Tests--Paragraph Reading
Battery II	1. Gates Oral Reading Test
	2. Gates Sight Vocabulary Test
	3. Roswell-Chall Word Parts Test
Battery III	1. Wepman Auditory Discrimination Test
	2. Sounds-Labeling
	3. Phonemes
	4. Words-Picture Identification
Battery IV	1. Classroom Noise Masking Test
	2. Sounds-Picture Identification
	3. Words-Repetition
	4. Word Pair Picture Discrimination Test
Battery V	1. Memory Tests
	2. Multiple-Choice Bender Gestalt Test
Battery VI	1. Continuous Performance Test

The Lorge Thorndike Intelligence Test, Level 2, Form A, was also administered in March of 1964.

All the tests except the Lorge-Thorndike Intelligence Test and the Gates Primary Reading Test were administered individually. All the auditory tests were presented by means of a tape recorder and, except for the Continuous Performance Test, were heard through earphones. The batteries ranged from 10 minutes to one hour in time.

The test batteries were administered four times. The first administration was before the treatment period, in December 1963 and January 1964. The second testing period was in May and June of 1964, immediately after termination of the treatment period. In November and December of 1964, six months after the treatment period, the tests were administered a third time; the fourth administration occurred 12 months after the treatment period, in May and June of 1965.

Project personnel administered the tests in the five schools used in the study. Six sessions were necessary to administer the six batteries, and the Lorge-Thorndike was given during a seventh session.

Auditory and Reading Tests Used

1. Auditory Tests

Eleven auditory tests were given to the children. Of these, nine were either constructed or specially modified for the present study. They were pilot tested and put into final form before the initial evaluation period. Reliability coefficients of the tests are reported in Chapter IV.

Four auditory areas were measured: Sound Recognition, Discrimination, Attention, and Memory. Within each area the tests were devised so as to form a hierarchy in level of difficulty of both stimulus and required response. For example, in the recognition area, the lowest level of stimulus difficulty was environmental sounds, the next level was words, and the most difficult stimuli were phonemes. Meanwhile, the type of response called for increased in difficulty from simple pointing to a verbal response.

Table 2 shows the 11 tests classified by auditory area and by nature of response required. All tests are described in more detail below and, copies of the specially constructed and modified tests are in Appendix A.

A. Recognition Tests. The hierarchy of difficulty of the recognition tests corresponds to their order of presentation below.

1. Sounds--Picture Identification

The preliminary form of this test consisted of items representing 20 familiar environmental sounds. In selecting these sounds an attempt was made to include only those which were likely to be part of the child's environment and which

Table 2

Auditory Tests

Auditory Area	Method of Response		
	Repetition	Picture Identification	Labeling
1. Sound recognition			
a. Familiar Sounds (2 Tests)		Familiar Sounds--Picture Identification [1]	Familiar Sounds, Labeling [1]
b. Familiar Words (2 Tests)	Familiar Words--Repetition [1]	Familiar Words--Picture Identification [1]	
c. Phonemes	Phonemes--Repetition [1]		
2. Sound Discrimination			
a. Word Pairs Test		Word Pairs Test [1]	
b. Wepman Auditory Discrimination Test			
3. Attention			
a. Continuous Performance Test			
b. Classroom Noise Masking Test [1]			
4. Memory			
a. Familiar Sounds--Recall and Recognition [1]			
b. Familiar Words--Recall and Recognition [1]			

1 = Tests constructed or modified for the study

could be reproduced on tape as unambiguously as possible. In addition, the sounds had to be capable of clear, unambiguous representation by picture.

The test task is as follows: the child hears the sounds played on a tape recorder. For each sound he is presented with four pictures; he is asked to point to the one which represents the sound he has just heard.

The three alternative pictures for each sound were selected to illustrate familiar environmental sounds similar to the stimulus sounds.

In the pilot testing done on a sample of eight third-grade children, 10 of the 20 items were missed by no children. Of the remaining 10 items, three items were missed by one child, one item was missed by two children, two items were missed by three children, and four items were missed by five to seven children. It was decided to retain all 20 items for the final test form, and to interpret performance on it as indicative of a base level of familiar sound recognition.

2. Sounds--Labeling

This test consists of 19 environmental sounds. Thesubject hears the taped stimulus sound through earphones. After each sound the examiner asks the child to name the sound he has heard.

In the first pilot testing of 22 items, nine items were not missed by any of the 12 third-grade subjects. A revised test, administered to an additional 10 third-grade children, included 12 of the original 22 items, and seven new items.Six of these 19 items were not missed by any subject. Every item was correctly identified by at least four children. All 19 items were retained. No further revisions were made because the test was to be used as a base measure.

3. Words--Picture Identification

This is a 20-word test, using only nouns, which requires the child to select from among four or five pictures the one corresponding to the stimulus word which is played on the tape recorder. The stimulus words were chosen from a list of words representing a full range of phonetic elements. The recognition level of the words was limited to preschool speech vocabulary taken from the Voice and Articulation Drillbook (Fairbanks, 1960 In selection of the multiple choice alternatives for the stimulus word, words were chosen which were phonetically similar to the stimulus word.

The original 44 test items were administered to nine third-grade children. Eleven items were missed by one or more children and these items were retained. In selecting an additional nine items from the remaining 33, those judged as having alternatives least phonetically similar to the stimulus word were first eliminated. The nine items were then randomly selected from the remaining 20 possibilities. The final test consists of these 20 stimulus words.

4. Words--Repetition

This test consists of a list of 30 words, played on a tape recorder, with sufficient time allowed after each presentation for the child to repeat the word.

The 30 words used in the test were selected from a list of 54 words in which all the phonetic elements were represented. The original 54 words were pilot-tested on 18 third-grade children. Thirty items were missed by at least one child, and these items constitute the final test.

5. Phonemes

The preliminary form of this test consisted of 199 phonemes divided into two separate tests for ease of administration during the pilot testing. The items covered all consonant sounds in both initial and final positions, vowel sounds, diphthongs, frequently-occurring double and triple blends, and common word endings. Each consonant and consonant blend was combined with a short "i" sound to make an intelligible stimulus for the child, e.g., "ti", "bli", "ip", and "ick" In those cases where "i" plus the phoneme formed a word, the short "u" vowel sound was used instead.

To administer the test a tape containing the phonemes is played for the child, who is asked to repeat each phoneme as he hears it. In scoring the responses to the consonants and blends which are combined with a vowel sound, only the reproduction of the consonant or blend is considered.

Pilot testing was done on a sample of 10 third-grade children. The 199 items were administered in two parts, with a time lapse in between. In the final form of the test, the 34 phonemes on which two to eight children made errors were retained. Also included to make up the 48 final items were 14 blends, digraphs, and vowel sounds which, although not as difficult as the 34 items, were considered by the staff to be of sufficient importance to reading skills to warrent inclusion in the test.

B. Sound Discrimination Tests. Two tests were used in this battery. One was a modified form of the Boston University Speech Discrimination Test (Pronovost & Dumbleton, 1953) called in the study the Word Pair Discrimination Test and the second test was the Wepman Auditory Discrimination Test.

1. Word Pair Discrimination Test

This test consists of 45 spoken (taped) word pairs, such as, "soldier-shoulder." The subject is asked to point to the one of three sets of paired pictures which illustrates the words he heard. For example, the alternatives to the correct pair, "soldier-shoulder," are pictures of soldier-soldier and shoulder-shoulder. Two-thirds of the 45 items are different stimulus words. The remaining one-third consist of the same word read twice.

To obtain items for the modified test, both the short and long forms of the original Boston University Speech Discrimination Test was administered to third-grade children. From analysis of both forms 13 items appeared to be discriminative.

An additional 40 different-stimulus word pairs were constructed by the project staff. The words were judged to be familiar to the children and, in addition, could be readily identified in picture form. Forty same-stimulus pairs were also given. The one word in each different-pair, to be used in the same-word pairs, was randomly selected. Ten third-grade children were given the 80 constructed test items. From three to eight children missed 36 of the items. These 36 items were retained, as well as nine of the 13 from the Boston University Speech Discrimination Test previously found to be discriminating. Those nine items maintained the 2/3 same-different-pairs: 1/3 same-pairs ratio, which had been judged appropriate for the purpose of the test.

2. The Wepman Auditory Discrimination Test

This test has 40 pairs of one-syllable words, of which 30 are "different" pairs with phoneme differences at the beginning, middle or end of the word, and 10 are "same" pairs. The child's task, on hearing each pair, is to tell whether the two words are the same or different.

C. Attention Battery. Two tests were included in this battery, the Continuous Performance and the Classroom Noise Masking Test.

1. Continuous Performance Test

The Continuous Performance Test had been modified for use in previous Institute studies and therefore was not specially modified for this project. The test requires the child to respond by pushing a button to the correct auditorally-given stimulus, the color, red, which is interspersed with other color names. A five-minute trial is given. Reaction times and the number of correct and incorrect responses are recorded automatically on tape.

2. Classroom Noise Masking Test

The stimuli for each of the eleven series used in this test are common words of one, two, or three syllables. Each series contains seven steps with varying degrees of masking overlay. The masking overlay used is recorded classroom noise, and both the density and the intensity of the masking decrease systematically with each successive step. The stimulus word is played at the same intensity in all steps in any given series. The step at which the child correctly recognizes the word is recorded as his score.

D. Memory Battery. The battery was constructed to measure delayed recall and recognition of familiar environmental sounds and words. All of the items were selected from sounds and words used on other tests of the auditory battery. The Memory Battery consists of two series, Sounds and Words, each requiring both recognition and recall of stimuli.

1. Sounds

The administration of the test is as follows. Seven environmental sounds are played for the child. After a 10-minute interval, the child is asked to recall the sounds. Then the seven sounds are replayed, interspersed with seven other sounds. The child is to indicate for each of the 14 sounds whether it had been played earlier. The same procedure is then performed with seven different stimulus sounds. In the present study during the 10-minute interval in each presentation half of the multiple-choice Bender Gestalt Test was given.[1]

2. Words

The test administration is as follows. Ten words are presented to the child by tape. After a 10-minute interval the child is asked to recall the words. Then the original 10 words are replayed, interspersed with 10 new words. The child is to indicate for each of the 20 words whether or not it had been played earlier. The procedure is then repeated with another series of words.

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[1] We are grateful to Drs. Joseph Wepman and Paul Weiner ~~and~~ of the University of Chicago for permitting us to use this test which is still in the experimental stage.

In the present study a nonverbal game was played during the first interval and the child drew pictures during the second 10-minute interval.

Items for the Words Test of the memory battery were chosen from the Words-Picture Identification Test, the Words-Repetition Test, the Wepman Test, and the Word Pair Discrimination Test. Each 10-word series contained the same number of easily recognized nouns and verbs. The words were approximately equal in length, and an attempt was made to separate any similar sounding words. The Sounds were selected from those on which no errors had been made in the pilot testing of the Sounds--Labeling Test. Again, any sounds judged to have similar elements were separated in the order of presentation.

Since the items used on the Memory Testswere all taken from proviously piloted tests of the auditory battery, pilot testing of the Memory Tests was done only to check the administration procedures. Since no difficulties were encountered in giving the test to five third-grade children, no changes were made in the original form of the test.

2. Reading Tests

The four reading tests used in the study are standardized tests, widely used in the field. A brief description of each is given below.

A. Gates Primary Reading Tests--Paragraph Reading (Gates PPR). This is a 36-item group test with a 20-minute time limit. The child is asked to mark in a specific way one of the three or four pictures for each item according to the directions given in the accompanying paragraph. The items increase in difficulty from the beginning to the end of the test. A reading grade score is obtained, based on the number of correct items.

B. Gates Oral Reading Test (from the Gates-McKillop Diagnostic Reading Tests). The test consists of seven paragraphs graded in reading difficulty. The child is asked to read aloud one paragraph at a time until he makes 11 reading errors in each of two successive paragraphs. A reading grade score may be obtained, but for this study the weighted raw score was used for data analysis. For the qualitative analysis, each type of error made by the child was also noted.

C. Gates Sight Vocabulary Test (from the Gates-McKillop Diagnostic Reading Tests). The test consists of 40 words arranged in order of difficulty. The child is asked to say each word. The test is discontinued when the child misses seven consecutive words. The child's score is the total number of correct words.

D. The Roswell-Chall Word Parts Test (from the Roswell-Chall Diagnostic Reading Test). This test is a revised version of the Roswell-Chall Diagnostic Reading Test. The form of the test used includes three subareas:

Sounds, Words, and Syllables. The Sound area, with 39 items, tests knowledge of isolated consonant and vowel sounds as well as consonant combinations. The Word area, with 32 items, tests knowledge of vowel sounds within words, and the syllabication area, with eight items, tests knowledge of rules to separate the parts of words. The total score for the test is a weighted total raw score, since some items are given more weight than others.

Treatment

Table 3 presents the distribution of the children and treatment groups for the study.

Table 3

Allocation of Treatment Groups by Tutor and Time

	Tutor 1		Tutor 2		Tutor 3		Tutor 4	
TIME	Type of Group	# of Ss	Type of Group	# of Ss	Type of Group	# of Ss	Type of Group	# of Ss
9:00-10:10	Reading-Play	2	Reading-Auditory	3	Reading-Play	3	Auditory-Play	4
10:30-11:40	Reading-Auditory	4	Reading-Play		Auditory-Play	3	Reading-Auditory	3
1:00-2:10	Auditory-Play	4	Auditory-Play	2	Reading-Auditory	3	Reading-Play	3
2:30-3:40	Reading-Auditory	2	Reading-Play	3	———		———	
Total Ss by Tutor		12		11		9		10

Each tutor gave instruction in each type of treatment. The sessions were 70 minutes in length. The reading-auditory group thus had 35 minutes each of reading and auditory instruction. The reading-only and auditory-only groups received 35 minutes of instruction and 35 minutes of play, in order to equalize the time each group spent with the tutor. The groups met three times weekly, making a total of 3½ hours per week of group work, or about 58 hours of time spent with the tutor during the course of the study. The control group received no treatment or play period. Sessions began in January, 1964, and were ended in May. Tutoring was done in two of the schools as well as at the Institute's Reading Center.

A description of the reading and auditory lessons and the play sessions is given in Chapter III.

III

Description of the Curriculum

The three types of group activities used in the study--remedial reading, play, and auditory training--are described below.

Reading Curriculum

The reading retraining phase of the study was organized on the basis of accepted remedial reading techniques, with reading methods and activities geared to the needs of the individual children. No attempt was made to standardize the activities of the different tutors or the different groups. However, since most of the third-grade children in the study showed similar degrees of reading retardation--approximately high first grade reading level--there was considerable similarity in the skills taught by the tutors even though specific techniques and materials varied.

In general, the aims of the reading program were to eliminate the gaps in each child's skills, to give him a degree of independence in reading, and to attempt to develop interest and motivation in reading. To this end, the reading program for each group usually began with reinforcement of first grade reading skills such as sight vocabulary and elementary phonic skills. More advanced skills were taught as the children became ready for them. Comprehension was emphasized throughout. Every effort was made to show the children how to apply the skills being taught to their reading and they were given repeated opportunities to do so.

Lessons included oral and silent reading from books of high interest and low reading level, comprehension exercises, and games to strengthen word analysis skills. The children were encouraged to express themselves orally and in writing. Some groups worked with a single reader, while others were organized on an individualized reading basis. Both commercial and tutor-made materials were used. The choice of methods and materials for each group was left to the discretion of the individual tutor.

Since training in those auditory skills included in the study's auditory curriculum is normally a part of remedial reading, they were introduced in the reading sessions as needed. No effort was made either to correlate them with skills being taught in the auditory sessions or to eliminate them from the reading retraining so as not to contaminate the study.

Appendix B contains a sample lesson from a remedial reading session.

Play Sessions

The purpose of the play sessions was to equalize the time spent with the tutor for those children in the reading-only and the auditory-only treatment groups. During the play sessions the tutors consistently avoided offering any kind of reading or auditory instruction. If stories were read or played on the tape recorder there were no readiness or follow-up activities. The stories were used only for the children's enjoyment and were presented only at their request. Generally, the children were directed away from looking at books, writing, spelling, or any other activities which would tend to reinforce reading and/or auditory skills. If a child insisted on one of these activities, however, he was allowed to pursue it independently, since it was not felt appropriate to "forbid" a child to read. He was given no help or encouragement in such an activity.

Several of the girls enjoyed playing "school" and "teacher" during the play sessions. They were allowed to do so as long as they did not require the participation of the tutor.

The tutor's primary role during the play sessions was to set and enforce limits on behavior and activities. Although suggestions and materials for play activities were made by the tutor, the children were encouraged to make their own choices. The tutor was at times a participant in the activities (at the request of the children) and at times an observer.

Typical materials and activities are listed below:

1. Listening to stories and records.

2. Playing trade games with others in the group and/or with the tutor. (For example, Checkers, "Old Maid" card game, Tiddlywinks, Bingo, Dominoes, Pick-up-Sticks.)

3. Drawing pictures, constructing objects from paper, paper dolls, coloring books.

4. Spontaneous conversation with the teacher and/or others in the group.

See Appendix C for a sample of a play session.

Auditory Curriculum

Since there were few examples of auditory programs in the literature the auditory curriculum was constructed specifically for this study. It was designed basically as a content program to teach those auditory skills which appeared to be related to reading. These skills will be described later.

This particular program was evolved on the bais of evidence cited in Chapter I that acquisition of auditory skills appears to follow a developmental sequence. It was expected that once the auditory skills were known, transfer of them to reading would occur as automatically for socially disadvantaged children as it appears to do for higher socioeconomic level children. Therefore, specific teaching of skills for transfer to reading learning was not considered necessary. The goal was to develop mature auditory skills which the child could then put to use in the reading situation. For this reason the reading and auditory aspects of the program were kept separate and no attempt was made to relate the two except through a minimum number of verbal, non-visual explanations of the relationship.

1. Areas of Instruction. The auditory curriculum was organized around four areas of instruction--recognition, discrimination, memory, and attentivity--paralleling those areas for which tests in the auditory battery had been developed. Each area is described below:

A. Sound Recognition

The major objective in this area was to develop skill in recognizing sounds, starting at a gross level with familiar environmental sounds and then progressing to recognition of whole words, rhyming words, word parts, and sounds within words. Recognition was defined as the ability to identify the sound (in the case of the environmental sounds) and/or ability to reproduce the sound (in the case of the word parts and phonemes).

A second objective in this area was to develop an awareness of the relationship of individual sounds to the spoken word, i.e., awareness of the fact that words are made up of a series of sounds. This awareness was seen as the ability to hear and identify within words the letter or letter combinations associated with a particular sound.

B. Sound Discrimination

In this area the objective was to develop skill in hearing differences among sounds, again starting at the gross level of familiar environmental sounds and progressing through words, word parts, and phonemes, until the child was able to make fine descriminations among sounds. The children were asked to make these discriminations at the beginnings, middles, and ends of words. They were encouraged to verbalize the similarities and differences they heard among the environmental sounds, words, and letter sounds.

C. Auditory Memory

The goal in this area was to increase accurate recall of material presented auditorially in the form of instructions or stories. Both immediate and delayed recall were involved, with and without regard to the sequence in which the material was presented.

D. Attentivity

The objectives in this area were to develop the child's ability to attend auditorially to a particular task and to increase his attention span. Although attentivity was designated as a specific area of instruction in the auditory curriculum it was basic to the other three areas, since it was not considered possible to teach skills in any auditory area without first establishing some degree of attentivity.

As can be seen, except for a brief introductory period in each area the emphasis was on activities involving the sounds of language. It was hypothesized that the practice of auditory recognition, discrimination, memory and attentivity skills within the context of language would contribute more directly to reading learning than would the practice of such skills by means of nonverbal activities.

The decision to build the auditory curriculum on a language framework was lent support by the discovery of the poor reading skills of the children in the study sample. The children seemingly came to the study with only one approach to analyzing unfamiliar words, i.e., shrewd guessing based on previously learned sight vocabulary words. They appeared to lack a systematized approach to decoding new words through sound-symbol relationships. In addition they possessed only a vague awareness of the relationship between speech sounds and visual symbols.

The inclusion of specific reading-related auditory skills in the curriculum was determined by the tutors. The basis for their judgments was the degree to which any particular skill seemed to be basic for developing independence in third grade word analysis skills and readings. Activities were developed to teach the auditory skills and were assigned to one of the four instructional areas on the bais of their major purpose. However, it was usually not possible to classify an activity as involving only discrimination, or recognition, etc., so that most activities were used in more than one instructional area.

2. Sequence of Activities. By contrast to the reading program, the auditory curriculum was a structured program in which the same skills were taught in the same sequence by all tutors with, of course, some allowance for time differences required by individual children or groups. A review of the detailed lesson reports indicated that the amount of time spent on a given activity varied only slightly from tutor to tutor. (See Appendix D for the sequence of auditory skills taught in each lesson.)

The auditory curriculum was based on the traditional educational practice of starting with something familiar to the children (in this case, environmental sounds) and progressing to more difficult, unfamiliar tasks through small, organized steps. The auditory skills were ordered on the basis of what the staff considered to be a developmental sequence.

The original plan called for mastery of one step of the sequence before the next step was introduced. In practice, however, it was found feasible to have several areas of activities going simultaneously, partly because of the increased opportunity this afforded for reinforcement of skills and partly because of the need to have as wide a variety of activities as possible in each session.

3. Specific Skills of the Auditory Curriculum. The sequential skill program developed to cover the four major areas is outlined below. The letters in parentheses alongside each item indicate the major instructional area or areas to which it was assigned:

R--Recognition

D--Discrimination

M--Memory

A--Attentivity

A representative list of activities for each item is given in Appendix E.

A. Environmental Sounds

(R) 1. Identification and labeling of environmental sounds heard on commercial records and in the classroom.

(D) 2. Discussion of ways in which sounds are alike and different (loud-soft, high-low, far-near, rhythm)

(M, A) 3. Recall of the details and sequence of the "sound" story heard on records.

B. Following Directions

(M, A) 1. Oral commissions--the child was given tasks to recall and carry out in proper order.

(M, A) 2. All aspects of the auditory lesson were utilized to develop facility in following directions, such as which sounds to listen for, how to respond, what to do next, etc. Meanings of terms such as square-circle, left-right, etc, were also taught.

C. Words

(R) 1. Repition of words spoken by tutor, with special attention to endings.

2. Rhymes,

(R, D, A) a. using poetry as a basis for discussion of words with the same endings.

(D, A) b. listening for words that rhyme

(R, D) c. supplying rhyming words.

(D) 3. Ways in which words sound the same or different--beginnings, middles, ends, number of "beats" or syllables.

4. Word Parts

(D, A) a. listening for common word endings (ing,s, er, est)

(R, A) b. counting syllables, or "beats".

D. Sounds of Letters and Letter Combinations

Letter sounds were taught in the following order: single consonants, consonant blends, long and short vowels. The children were taught to listen for these sounds in various positions in words. The initial position, the final position and the medial position.

The procedure for teaching all letter sounds was as follows:

(R) 1. Introduction of the sound in the initial position in whole words.

(R, D) 2. Recognition of words beginning with the sound being taught; discrimination between words that did and did not begin with the sound.

(R, D) 3. Supplying words beginning with the sound.

(R) 4. Repetition of the sound in isolation. (If difficulties were encountered in this step, instruction was given on how to form the sound in the mouth.)

(R, D) 5. Association of the sound with the visual symbol and letter name.

(R,D,M,A) 6. Recognition and discrimination of the sound in final and medial positions.

E. Blending Sounds into Words

Depending on the extent of the ability of the individual child to belnd sounds auditorially without the use of visual symbols, practice was given in blending learned sounds into words. This was done primarily through imitation of the tutor. A minimum of time was devoted to this activity due to the difficulty encountered in teaching this skill without visual reinforcement.

Two additional activities were included in the curriculum although they did not fit into any particular place in the sequential order of skills. They were used throughout the treatment period.

F. Listening to Stories

Stories were presented on records or were read or told by the tutor. Listening goals were set before the stories were heard. Children were asked to listen for sequences, for specific details, and to anticipate the outcome of the story.

G. Telling Stories

The children retold familiar stories or created original ones. Their attention was focused on producing a logical sequence of events and on making themselves understood to the group. A tape recorder was used to record the stories, and to provide feedback for the children on their own stories. A sample lesson from the auditory curriculum is seen in Appendix F.

4. Limitations Imposed on the Auditory Curriculum

As stated previously, the auditory curriculum was presented to the children separately from the reading program, and gave no specific instruction or practice in applying auditory skills to reading. In order to achieve a clear distinction between the auditory and reading treatments, certain limitations were established for the auditory curriculum:

A. In so far as possible, all teaching was done orally. Visual and kinesthetic reinforcement of auditory skills were eliminated and no reading materials or writing were permitted. Minimum use was made of unlabeled pictures, primarily for motivational purposes. Use of visual symbols for letters of the alphabet was permitted in teaching letter sounds. These symbols were used singly, however, and were never combined into words. Such use of letters seemed justifiable because the children came into the study with a fairly complete knowledge of letter names and symbols which they soon associated spontaneously with the sounds being taught.

To insist on eliminating such associations seemed to be artificial and undesirable.

B. Comprehension skills were included in the auditory program only in connection with listening or memory activities, since it was felt that comprehension was not entirely a function of auditory perception. Listening (attention) and memory aspects of comprehension were stressed rather than any systematic instruction in comprehension of unknown words or concepts.

It was assumed that in presenting the curriculum each tutor would choose materials within the understanding of her groups or would take steps to clear up any misunderstandings that arose so that auditory skills could be taught using materials already familiar to the child.

C. No attempt was made to deal with the child's pronunciation distortions, except in a very general way when they interfered with the teaching of the auditory skills. For example, in identifying final consonant sounds, a child who habitually said "teef" for "teeth" was encouraged to practice the proper pronunciation whenever he said the word.

In summary, then, the auditory curriculum constructed for the study was a developmental one, organized around four areas of instruction, recognition, discrimination, memory and attentivity. All of the auditory treatment groups received the same sequence of instruction. An effort was made to separate the skills taught in the auditory and reading programs so that the effect of the auditory program on the reading program could be more clearly seen.

IV

Quantitative Analysis

To answer the question posed in the study, two types of analyses were done. First quantitative analyses were done to measure the effects of the various treatments on the test scores obtained in the three post-test periods. These are described in the present chapter. Secondly, supplementary analyses were obtained including tutors' qualitative evaluations of the auditory curriculum, assessment of the children's learning characteristics, and assessment of the children's progress in the learning sessions. These are reported in Chapter V.

The quantitative analyses were done to investigate the effects of the various treatments, the different tutors, the times of testing, and the two ethnic groups on the reading and auditory scores. An analysis of covariance was used to explore these relationships; because of the possible effects of the children's intelligence test scores and their auditory and reading pre-test scores on the subsequent scores of the same tests, a covariance rather than variance analysis was used.[1]

In addition, a comparison of pre-test and post-test scores was made to find any significant differences between them. Correlation matrices for the pre-test and post-test I auditory and reading scores were obtained. A factor analysis of these tests was also done. Error analyses of items from some of the auditory and reading tests for the pre-test, post-test I and, in some cases for the post-test III periods, were undertaken. All of the above described analyses are presented in the present chapter.

A. Reliability of the Auditory Tests

Reliability coefficients, using the Kuder-Richardson formula 20, were computed for most of the auditory tests which were constructed for the study. No coefficients were computed for the two Memory-Recall Test scores. On those two tests the scores were the number of items the child recalled rather than scores on all of the items so presented. A reliability coefficient for the scores would have no meaning.

The coefficients of the other tests are shown on Table 4. Only one test, Sounds-Picture Identification, showed a reliability coefficient that did not differ significantly from zero. Any interpretations involving this test must therefore be made with care. The other reliability coefficients were significant at the .01 level, except for Memory-Sounds-Recognition Test which was significant at the .05 level.

The figure used as a cut-off point for adequate reliability was .50. Reliability coefficients reached this level for all tests but the Sounds-Labeling Test and the Memory-Sounds-Recall Test. Therefore,

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[1] This study is essentially a multivariate one with different pre-test covariates for each multivariable. The 1620 computer library did not contain a program compatible with this model, so an analysis of covariance program was used.

Table 4

Reliability Coefficients for the Auditory Tests[a]

Test	N	Reliability Coefficient
Sounds-Picture Identification	59	.05
Sounds-Labeling	59	.42**
Words-Repetition	59	.64**
Words-Picture Identification	59	.56**
Phonemes	59	.65**
Word Pair Discrimination	59	.80**
Memory-Sounds-Recognition	58	.27*
Memory-Words-Recognition	57	.68**

[a] using the Kuder-Richardson Formula 20

*significant at .05 level

**significant at .01 level

of the ten auditory tests constructed for the study, five were considered of sufficient level of reliability to be adequate for research purposes and three were not. Two tests were not tested for reliability.

B. Analyses of Covariance

The hypothesis for the study suggested that the group receiving reading-auditory training would make the most improvement in reading, while the control group would improve the least in reading skills. These assumptions about the effects of the various treatments on the reading achievement measures were to be explored at various times after the treatment period. Such an analysis would answer such questions concerning the treatment groups as to what effect did auditory training have on the auditory-only treatment group, as compared to its effect on the auditory-reading treatment group, or how did the reading-only treatment compare to the auditory-only treatment in its effect on reading achievement.

The subjects for the study were such a select group that results can be generalized only to children similar to the ones in this study. However it was hoped that the results would be suggestive for other samples as well.

Besides the effects of treatment, there were other factors which were seen to influence the reading and auditory scores. The sample was comprised of Negro and Puerto Rican children. It was noted that the speech characteristics of the groups differed, a factor possibly effecting their reading and auditory skills. Thus, it seemed important to consider ethnicity as well as type of treatment as an independent variable in the analyses.

A third possible factor was tutor differences. There was already some evidence that teacher characteristics play a part in reading learning (Chall and Feldmann, 1966).In the present study it was hoped that tutor differences would not differentially affect reading or auditory scores, but as a check, tutor effect was also used as an independent variable.

A fourth factor was a developmental one, the passage of time. This factor was known to be highly related to the learning of young children. Therefore, scores from three post-test periods were included as the fourth independent variable.

In summary, treatment, ethnicity, tutor, and time were the independent variables for the study. The effects of each variable on all of the reading and auditory measures, as well as any interactions that might occur among the four in affecting dependent measures were investigated. In addition, two other variables, intelligence and initial reading and auditory skill measures, were thought to possibly influence the end results. Therefore, they were used as covariates. The covariate analysis also served to reflect the repeated measures aspect of the study.

A four-way analysis of covariance was indicated, but the sample N of 45 to 57 (depending on time of testing) did not allow such, since the some of the resulting cells would have been missing, a condition incompatible with programs in the 1620 library. Therefore, two 3-way analyses of covariance were used. The first analysis used as independent variables, treatment, time of testing and tutor, while the second analysis used treatment, time and ethnic group as independent variables. The first analysis did not include the control group, since the control group did not have any tutors. The intelligence scores and the particular pre-test auditory or reading scores appropriate to the dependent variable were used as covariates in both analyses.

The four reading tests and 11 auditory tests served as measures of reading and auditory improvement. The modified Bender Gestalt Test, given during the Auditory Memory Battery, was also included in the analysis as a dependent variable. Many of the tests were comprised of subparts or were scored in more than one way, so 27 scores resulted from the above 16 tests. The 27 scores were used as the dependent variables in the analyses.

Tables 5 and 6 show the significant main effects and significant interaction effects from the two analyses.[1.] From Table 5 it can be seen that six of the dependent variables showed significant differences in scores when the main effect was treatment group, 13 dependent variables showed time effects and 11 showed tutor effects. Table 6 shows that on the second analysis of covariance there were five treatment effects, 16 time effects and 10 ethnic group effects.[2.] The program used for the covariance analysis did not tell which group or combination of groups had the higher scores on the dependent variables. Therefore multiple comparisons were done to see whether particular groups of the variables which were hypothesized to have higher scores did have significantly higher test scores.[3.]

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1. The F's computed for the analyses of covariance were evaluated in the standard univariate manner. However, because of the correlated nature of all the data, the probability values associated with those F's are inflated.

2. Appendix G and H present the values of F corresponding to Tables 5 and 6.

3. Where overall significance was found at the 5% level in the analysis of covariance multiple comparisons involving differences of means in pairs were made. No other contrasts were considered meaningful psychologically except in one case where the mean of three groups was compared to the mean of a fourth (see Page 33).

Tukey's method (Scheffé, 1958, P.73) was used for evaluating the significance of the statistics resulting from the multiple comparisons

(footnote 3 is continued at the bottom of page 32)

Table 5

Significant Main and Interaction Effects and Covariate Relationships For the Treatment by Time by Tutor Analysis[a]

Dependent Variable	Main Effects: Treat-ment	Main Effects: Time	Main Effects: Tutor	Interaction Effects: Treat-ment x Time	Interaction Effects: Treat-ment x Tutor	Interaction Effects: Time x Tutor	Interaction Effects: Treat-ment x Time x Tutor	Covariates: IQ	Covariates: Pre-Test
Gates PPR		x							
Gates Oral Reading	x	x	x		x			x	x
Gates Sight Vocabulary	x	x			x			x	x
Roswell-Chall Sounds			x						x
Roswell-Chall Words		x	x		x				x
Roswell-Chall Syllables		x			x			x	
Roswell-Chall Total Score		x	x						x
Bender Gestalt I-Mem.					x				
Bender Gestalt I-Match.									
Bender Gestalt II-Mem.									
Bender Gestalt II-Match.	x		x						
Sounds-Pic. Ident.		x	x		x				
Sounds-Labeling					x			x	x
Words-Repetition	x	x			x			x	x
Words-Pic.Ident.	x								x
Phonemes			x			x			x
Word Pair Disc.	x				x				x
Wepman		x							x
CNMT-Total		x							x
Memory-Sounds-Recall		x			x				
Memory-Sounds-Recog.			x						
Memory-Words-Recall									
Memory-Words-Recog.									x
CPT Reac. Time-101-2000 msec.			x					x	x
CPT Reac. Time-101-1000 msec.			x						x
CPT # Resp. - 101-2000 msec.		x			x				x
CPT # Resp. - 101-1000 msec.		x	x						x

a. Significant at at least .05 level

Table 6

Significant Main and Interaction Effects and Covariate Relationships For the Treatment by Time by Ethnic Group Analysis [a].

Dependent Variable	Main Effects			Interaction Effects				Covariates	
	Treatment	Time	Ethnic Group	Treatment x Time	Treatment x Ethnic Group	Time x Ethnic Group	Treatment x Time x Ethnic Group	IQ	Pre-Test
Gates PPR		x							
Gates Oral Reading	x	x	x		x			x	x
Gates Sight Vocabulary	x	x	x		x			x	x
Roswell-Chall Sounds	x		x						x
Roswell-Chall Words		x	x					x	x
Roswell-Chall Syllables		x						x	x
Roswell-Chall Total Score	x	x	x						x
Bender Gestalt I-Mem.			x						
Bender Gestalt I-Match.			x						
Bender Gestalt II-Mem.			x						
Bender Gestalt II-Match.			x						
Sounds-Pic. Ident.		x							
Sounds-Labeling									x
Words-Repetition		x							x
Words-Pic. Ident.								x	x
Phonemes		x							x
Word Pair Disc.		x							x
Wepman	x	x	x					x	
CNMT-Total		x							x
Memory-Sounds-Recall		x							
Memory-Sounds-Recog.					x				
Memory-Words-Recall		x							
Memory-Words-Recog.							x	x	x
CPT Reac. Time-101-2000 msec.									x
CPT Reac. Time-101-1000 msec.									x
CPT # Resp. - 101-2000 msec.		x							x
CPT # Resp. - 101-1000 msec.		x						x	x

a. Significant at at least .05 level

Table 7 shows the results of the multiple comparisons using the independent variables treatment, time and tutor from the first analysis of covariance which had shown significant F's. Appendix I gives the values for the treatment, time and tutor multiple comparisons.

Table 7

Results of the Multiple Comparisons of the Main Effects from the Analysis of Covariance-Treatment by Time by Tutor

Independent Variable	Comparison	Significance
Treatment Effects		N.S.
Tutor Effects		
Roswell-Chall Words	T.2 vs.T.3*	<.10
Roswell-Chall Words	T.4 vs.T.3*	<.10
Time Effects		
Gates Oral Reading	Post-test I vs.III*	<.10
Gates Sight Vocabulary	Post-test I vs.III*	<.05
Gates Sight Vocabulary	Post-test II vs.III*	<.10
Roswell-Chall Syllables	Post-test I vs.III*	<.10

* higher scores

As can be seen from Table 7 none of the multiple comparisons by treatment groups resulted in significant differences on the six dependent variables. Apparently no one treatment group was superior on test scores to any other treatment group.

Of the six comparisons made with the individual tutors, significant differences were found for only one of the 11 dependent variables, the Roswell-Chall Words. Tutor 3's children did better on that test than did the children of tutors 2 and 4.

Six multiple comparisons were made for the time of testing or between the three post-test scores for the 13 dependent variables

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of any one treatment (tutor or time) with any other treatment (tutor or time). The 10% level of significance was used because the error rate was by family of comparisons with respect to the main effects of factors or their interactions. A one or two-tail test was used, depending on whether or not any predictions were made as to the outcomes of the results.

previously showing significant F's. The results showed that for the Gates Oral Reading, Gates Sight Vocabulary, and Roswell-Chall Syllables the children receiving treatment performed significantly better on the third post-test than they did on the first post-test. For the Gates Sight Vocabulary test, they also performed significantly better on the third post-test than on the second post-test.

Thus, the results on the first analysis of covariance indicate that the variables time and tutor were related to an increase in reading scores for the treatment groups.

Multiple comparisons of means were also done for the second analysis of covariance, which showed significant main effects for treatment, time, and ethnic group. Appendix J gives those values. There were no significant mean differences found for the combinations considered meaningful to the study. These combinations, as in the previous analysis, were the comparisons of one treatment mean (time mean or ethnic group mean) with any other such mean.

The statistically significant mean effects found in the overall analysis of covariance apparently would be found in combinations not useful in investigating the hypothesis of the present study. In the second mean comparison analysis no time effects were found as in the first analysis. The sample in the second analysis differed in that the control group was included in it. Therefore, the non-significant time effect was probably due to the inclusion of the control group.

A comparison was also done to see whether the three treatment groups combined had higher scores than the control group (groups 1, 2, 3, vs. 4).[1] No significant results were obtained.

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[1] A one-tail test was used at the 10% level of significance. Since the control group was compared to all the others, the resulting statistic was evaluated with the use of Dunnett's table. As there is no Dunnett's table for the 10% level of significance, the values required for the 5% level of significance were plotted against the number of treatments, excluding the controls, and a curve was drawn for the 5% level. From the t-table, the value for the 10% level for one treatment case was found. From this point, a curve for the 10% level was drawn by following the general shape of the first curve, that for the 5% level. From this approximated curve, the value required for the three treatment cases at the 10% level could be determined.

Tables 5 and 6 also showed that there were a number of significant two-way interaction effects and one three-way interaction effect among the variables. Therefore, multiple comparisons for these variables were tested to ascertain whether or not the true interactions for each of the cells were zero, when the linear effects of intelligence and pre-test auditory or reading scores were removed.[1]

There are dependency relationships among interactions. Thus, if from among four tutors, one tutor interacted postively with a particular treatment, it could be interpreted that that group's scores were higher with that particular tutor than they would have been with a tutor who had either interacted negatively with that treatment group or who did not interact at all with that treatment group.

The results of the interaction effects are discussed according to the two groupings used in the analysis of covariance: treatment by tutor by time; and treatment by ethnic group by time.

1. Treatment by Tutor by Time Analysis

There were no significant three-way interaction effects found. However, two-way interaction effects, treatment by tutor, and time by tutor, were found. Tables 8-11 present those data.[2] Each of the two-way interaction effects will be presented separately.

a. Treatment by Tutor Interaction Effects

Table 8 lists for each of the four reading scores the treatment by tutor interactions which were significant.

As can be seen, the direction of the treatment by tutor interactions, either positive or negative, was consistent from one reading variable to the next. For example, if there was a positive interaction of Tutor 1

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[1] The resulting statistic was evaluated for significance by Sheffé's method (Scheffé, 1958, p.110), with significance for two-tailed alternations set at the 10% level.

[2] A table with the complete values of the cell interaction statistics for the analysis is found in Appendix K.

Table 8

Significant Treatment by Tutor Interaction Effects for the Reading Scores

Dependent Variable	Treatment	Tutor	Direction
Gates Oral Reading	R-P [a.]	1	+
	R-P	3	-
	A-P	3	+
	R-P	4	+
	A-P	4	-*
Gates Sight Vocabulary	R-P	1	+
	A-P	3	+
Roswell-Chall Words	R-P	1	+
	R-A	1	-
	A-P	1	-
	R-P	3	-
	A-P	3	+
Roswell-Chall Syllables	R-P	1	+
	R-A	1	-
	A-P	1	-
	R-P	2	-
	R-A	2	+
	A-P	3	+
	R-P	4	+
	A-P	4	-

a. R-P = Reading-Play
R-A = Reading-Auditory
A-P = Auditory-Play

* Significant at .10 level; others are significant at at least the .05 level.

with the reading-auditory group for one reading score, then any other Tutor 1 and reading-auditory group interaction for the reading scores was also positive. The four reading scores shown on Table 8 appear to be interrelated, as data from the correlation matrix and factor analysis in this chapter also indicate.

Looking at the results for each tutor separately, Tutor 1 interacted positively with the reading-play group on the four reading scores. Her interactions with the other two groups, the reading-auditory and the auditory-play group were negative. Apparently, Tutor 1's auditory teaching methods resulted in lower scores for the reading-auditory and auditory-play groups on the Roswell-Chall scores than those groups would have had with the other tutors. The fact that the negative interaction effect was found for only two of the four reading socres might indicate only particular components of reading were related to the tutor-treatment combination.

The pattern for Tutor 2 is not as clear as that of Tutor 1. The significant interactions of tutor and treatment occurred with the Roswell-Chall Syllables Test, one in a positive direction and one in a negative direction.

There was a positive interaction of Tutor 3 with the auditory-play group on the four reading scores. Apparently, the training given in the auditory sessions by Tutor 3 increased the reading scores in relation to the other tutors' training given in this treatment. Tutor 3 interacted negatively with the reading-play group on two of the reading scores.

The interactions of Tutor 4 with the reading-play and auditory-play groups were in the opposite direction from Tutor 3. There was a negative interaction shown with the auditory-play group and a positive interaction with the reading-play group on the reading tests.

Tutor by treatment interaction effects were also shown on the Bender-Gestalt Test, a test of visual perception. Table 9 shows these interaction effects.

Table 9

Significant Treatment by Tutor Interaction Effects for the Bender-Gestalt test

Dependent Variable	Treatment[a]	Tutor	Direction
Bender-Gestalt I-Memory	R-P	2	+
	A-P	2	-
	R-P	4	-
	R-A	4	+

[a] R-P=Reading-Play
R-A=Reading-Auditory
A-P=Auditory-Play

No specific training of the kind measured by the Bender-Gestalt test was included in the programs. Yet the reading-play group scored higher in that area with Tutor 2 than they would have with another tutor, and the reading-auditory group scored higher with Tutor 4.

Table 10 shows the relationships of the independent variables to the auditory tests. As can be seen the relationships were not as consistent in direction as were those found with the reading tests, since a particular tutor and treatment interaction was negative with some of the auditory scores and positive with other auditory scores.

Tutor 3 was the only tutor who, when in interaction with the same treatment group, showed consistent direction in the test scores. In other words, there was a positive interaction of Tutor 3 with the auditory-play group and a negative interaction with the reading-play group on the auditory scores.

b. Time by Tutor Interactions

A significant tutor by time interaction was shown by only one variable, the Phonemes Test. The results of this comparison is summarized in Table 11. No consistent direction in scores was seen for any of the tutors.

Table 11

Significant Time by Tutor Interaction Effects for the Auditory Scores

Dependent Variable	Tutor	Post-test	Direction
Phonemes	1	I	-
	1	III	+
	2	I	+
	2	II	-
	2	III	+
	3	I	-
	4	I	+
	4	II	+
	4	III	-

2. Treatment by Time by Ethnic Group Analysis

Several interactions of interest were found in the second of the analyses of covariance. First, treatment by ethnic group interactions were found. Table 12 presents those results.[1].

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[1] A table showing the values of the cell interaction statistic for Treatment by Time by Ethnic Group Analysis is in Appendix L.

Table 10

Significant Treatment by Tutor Interaction Effects for the Auditory Scores

Dependent Variable	Treatment	Tutor	Direction
Sounds-Picture Ident.	R-P[a]	1	-
	R-A	1	+
	R-P	2	+
	R-A	2	-*
Sounds-Labeling	R-P	1	+
	A-P	1	-*
	R-A	3	-
	A-P	3	+
	R-P	4	-
	R-A	4	+
	A-P	4	-
Words-Reptition	R-P	2	-
Word Pair Discrimination	R-P	2	+
	R-A	2	-
	R-P	3	-*
	R-P	4	-
	R-A	4	+
Memory-Sounds-Recall	R-A	1	-
	R-P	2	+
	A-P	2	-
	A-P	3	+
	R-P	4	-
	R-A	4	+
CPT # Resp. 101-2000 msec.	R-P	2	+
	A-P	2	-
	R-P	3	-
	A-P	3	+
	R-P	4	+
	R-A	4	-

a. R-P = Reading-Play
R-A = Reading-Auditory
A-P = Auditory-Play

* Significant at .10 level; others significant at at least .05 level.

Table 12

Significant Ethnic Group by Treatment Interaction Effects for Reading Scores

Dependent Variable	Treatment	Ethnic Group	Direction
Gates Oral Reading	R-P[a]	PR	-
	R-P	Negro	+
	A-P	PR	+
	A-P	Negro	-
	Control	PR	-
	Control	Negro	+
Gates Sight Vocabulary	R-P	PR	-
	R-P	Negro	+
	A-P	PR	+
	A-P	Negro	-

a. R-P = Reading-Play
R-A = Reading-Auditory
A-P = Auditory-Play

As can be seen, there was a positive interaction of the Puerto Rican children with the auditory-play treatment and a positive interaction of the Negro children with the reading-play treatment on two of the reading tests. Thus, the Puerto Rican children who received auditory training only performed better on the reading tests than did the Negro children who received auditory training only. On the other hand the Negro children responded better than the Puerto Rican children to reading instruction alone. One possible explanation is that the Puerto Rican children, who are bilingual and therefore not as familiar with patterns of standard English sounds as the Negro children may be, may have benefited more from auditory training in regard to their reading learning. The Negro children apparently benefited more from reading instruction alone than from auditory instruction in regard to their reading learning, perhaps because the auditory training confused their knowledge of sounds rather than helped it in transferring to reading skills.

In line with the above reasoning is the observation that the interaction of the Negro children in the control group was positive for the Gates Oral Reading Test while the interaction of the Puerto Rican children in the control group was negative. Apparently the Negro children seemed to have benefited more than the Puerto Rican children from the reading instruction given in the classroom. Perhaps the Puerto Rican children needed more auditory instruction than was given with the regular reading instruction in the schools.

However,these control group interactions occurred for only one of the reading tests, so the supposition does not have strong support.

The absence of interactions of the reading-auditory treatment group indicated that there were no differential results by ethnic group related to that treatment, this perhaps could be interpreted as evidence that one kind of treatment for each of the ethnic groups was more beneficial than a combined treatment.

There was only one auditory test which produced significant ethnic group by treatment interactions. The results are shown on Table 13.

Table 13

Significant Ethnic Group by Treatment Interaction Effects for the Auditory Scores

Dependent Variable	Treatment	Race	Direction
Memory-Sounds-Recog.	R-P[a]	PR	+
	R-P	Negro	-
	R-A	PR	-
	R-A	Negro	+

a. R-P = Reading-Play
R-A = Reading-Auditory
A-P = Auditory-Play

One three-way interaction was also obtained for an auditory test, the Memory-Words-Recognition Test. A test for the significant cell interaction was not carried out for that test since no computer program was available.

C. Pre-test to Post-test I Improvement

Since the pre-test scores for the reading and auditory tests were used as covariates in the analyses of covariance just described, no measure of the time effect for changes in scores ~~from~~ pre-test to post-test I could be obtained. Therefore to measure any possible improvement on the reading and auditory scores from the pre-test to post-test I, two sets of t-tests were obtained,one for the experimental group and one for the control group. Using the children in the three experimental groups as one group, pre-test scores were subtracted from their post-test I scores and the means found. These mean differences for each of the 27 dependent variables were tested for significance, taking out the effect of the IQ. The same procedure was followed with the control group. Table 14 shows the values of t for the experimental group and for the control group.[1].

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[1] The means for each of the four groups at each time of testing are found in Appendix M.

Table 14

t Values for Mean Difference Scores for the 27 Reading and Auditory Tests, for Two Groups of Children, from Pre-test to Post-test I

Dependent Variable	Experimental Groups	Control Group
Gates PPR	0.13	-0.10
Gates Oral Reading	-0.47	-0.27
Gates Sight Vocabulary	-0.98	1.20
Roswell-Chall Sounds	0.70	0.48
Roswell-Chall Words	-1.71	-0.77
Roswell-Chall Syllables	-1.80	0.31
Roswell-Chall Total Score	-0.76	0.18
Bender Gestalt I - Mem.	1.04	0.78
Bender Gestalt I - Match.	-0.44	1.28
Bender Gestalt II - Mem.	-0.09	1.34
Bender Gestalt II - Match.	0.09	0.97
Sounds-Pic. Ident.	1.52	-0.08
Sounds-Labeling	0.71	-0.71
Words - Repetition	0.22	1.60
Words-Pic. Ident.	-1.13	1.25
Phonemes	-0.65	2.20*
Word Pair Disc.	0.92	1.45
Wepman	1.59	1.53
CNMT - Total	1.14	-0.57
Memory-Sounds-Recall.	-0.21	1.24
Memory-Sounds-Recog.	0.31	0.12
Memory-Words-Recall.	-1.63	1.98*
Memory-Words-Recog.	0.57	2.49*
CPT Reac. Time 101-2000 msec.	1.50	-0.12
CPT Reac. Time 101-1000 msec.	1.87*	-0.45
CPT # Resp. 101-2000 msec.	0.77	0.98
CPT # Resp. 101-1000 msec.	-0.32	0.14

* Significant at .05 level

As can be seen, the combined experimental group showed statistically significant improvement from pre-test to post-test I on only one of the 27 scores, the CPT Reaction Time 101-1000 msec. score. The control group showed significant improvement on three of the auditory tests, Phonemes, Memory-Words-Recall and Memory-Words-Recognition.

These results seem surprising since inspection of the raw data showed consistent increases in scores for a large number of the dependent variables from pre-test to the later testing. Apparently, the many non-significant results were attributable to the removal of the effect of intelligence on the reading and auditory scores.

D. Correlation Matrices

Another subsidiary analysis, correlation matrices of the tests, were obtained to explore the relationships among the tests at the various testing periods. The matrices were computed, using the total sample, for the pre-test measures, the post-test I measures, and for the pre-test versus the post-test I measures. The matrices included the 27 reading and auditory tests. Tables 15-23 show those data. The post-test I versus pre-test correlations were not analysed as the prediction of the post-test by the pre-test was not considered meaningful for this study.

Reading Tests

Pre-test

As can be seen on Table 15, there were significant intercorrelations among the reading tests, with some exceptions. One substantial correlation was seen between the Gates PPR and the Gates Sight Vocabulary Test. However, many of the significant intercorrelations were low. One major exception was that the Gates PPR did not correlate with the Roswell-Chall subtests and total score. The rescored Gates PPR test which is explained in Section F in this chapter, showed about the same relationship to the other reading tests as did the regularly scored Gates Test.

Post-test I

All the post-test scores of the reading measures, including the Gates PPR had significant intercorrelations. See Table 16. All of the correlations were higher than in the pre-test matrix. The rescored Gates PPR again showed the same relationship to the other reading tests as did the usual method of scoring the test.

Table 15

Reading Test Intercorrelations - Pre-test
(N = 55-58)

	1	2	3	4	5	6	7	8
1 Gates PPR - Standard Score		.82*	.24*	.45*	-.08	.05	.18	-.02
2 Gates PPR - Weighted Score			.12	.32*	-.13	-.08	.22*	-.08
3 Gates Oral Reading				.62*	.34*	.31*	.40*	.41*
4 Gates Sight Vocabulary					.38*	.37*	.42*	.46*
5 Roswell-Chall Sounds						.31*	.46*	.97*
6 Roswell-Chall Words							.15	.44*
7 Roswell-Chall Syllables								.61*
8 Roswell-Chall Total Score								
Mean	1.16	60.40	.38	6.29	13.59	.72	1.17	15.48
S. D.	.33	14.37	.24	3.30	5.01	.91	1.22	6.01

* Significant at .025 level

Table 16

Reading Test Correlations - Pre-test vs. Post-test I
(N = 55-58)

Pre-test	Post-test I							
	1	2	3	4	5	6	7	8
1 Gates PPR - Standard Score	.46*	.44*	.40*	.40*	.02	.16	.30*	.14
2 Gates PPR - Weighted Score	.39*	.38*	.28*	.28*	.01	.07	.11	.05
3 Gates Oral Reading	.59*	.56*	.49*	.55*	.14	.37*	.40*	.30*
4 Gates Sight Vocabulary	.66*	.61*	.60*	.71*	.18	.53*	.54*	.41*
5 Roswell-Chall Sounds	.28*	.24*	.33*	.32*	.32*	.35*	.42*	.41*
6 Roswell-Chall Words	.24*	.26*	.28*	.32*	.09	.34*	.35*	.25*
7 Roswell-Chall Syllables	.28*	.25*	.14	.24*	.02	.21	.22*	.13
8 Roswell-Chall Total Score	.33*	.29*	.35*	.37*	.29*	.38*	.45*	.41*

* Significant at .025 level

Pre-test Versus Post-test I

As can be seen on Table 17, the reading pre-test scores were significantly correlated with the reading post-test scores with a few exceptions. In general, the correlations, though significant, were low. As a one-tail test was used for all the correlations, the negative correlations were not considered significant even though the numerical values were high enough.

Auditory Tests

Pre-test

Auditory tests were divised to measure four areas of auditory ability: recognition, discrimination, attention, and memory.[1] The *a priori* designation of tests into these areas was not well substantiated by the correlation matrices shown on Table 18.

Among the five auditory recognition tests, there were four significant intercorrelations out of a possible ten correlations, and those were not strong. Of the discrimination tests, the Word Pair Discrimination Test did correlate significantly with the Wepman Test, but it had a higher correlation with three of the five auditory recognition tests. Thus the Word Pair Discrimination Test seemed to belong with the recognition tests rather than with the other discrimination test.

There seemed to be a small cluster of correlations among the various Memory Test scores, with five out of the possible twenty-one correlations being significant.

As expected the various subparts of the Classroom Noise Masking Test intercorrelated.

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1. For the memory tests a recall score and recognition score were obtained, as described earlier. The recognition score was composed of three scores. The child was presented with a list of words (or sounds) which was comprised of essentially two parts; those words (or sounds) that were presented earlier in the memory battery which the child was asked to recall (the correct identification of these words [or sounds] was the Recognition A score) and those words (or sounds) which were not in the recall list. The words (or sounds) which were not in the recall list were again of two types. Firstly, there were those words (or sounds) that had never been presented in any of the testing sessions (the correct identification of these words [or sounds] was the Recognition B Score). Secondly, there were those words (or sounds) the child had heard sometime in the other auditory tests but were not in the memory test (the correct identification of these words [or sounds] was the Recognition C score). Due to an oversight, Recognition B and C scores were combined in some of the correlation matrices. In all the other analyses (except the correlation matrices), the three recognition scores were intentionally combined into one total score.

Table 17

Reading Test Intercorrelations* - Post-test I
(N = 55-58)

	1	2	3	4	5	6	7	8
1 Gates PPR - Standard Score		.94	.75	.78	.37	.66	.57	.57
2 Gates PPR - Weighted Score			.73	.73	.32	.63	.50	.51
3 Gates Oral Reading				.85	.42	.76	.78	.69
4 Gates Sight Vocabulary					.43	.74	.77	.68
5 Roswell-Chall Sounds						.49	.56	.90
6 Roswell-Chall Words							.76	.80
7 Roswell-Chall Syllables								.82
8 Roswell-Chall Total Score								
Mean	1.91	87.02	1.16	12.32	25.15	3.90	4.26	33.30
S. D.	.37	11.22	.53	4.40	6.91	3.46	2.90	11.37

* All figures significant at .025 level

Table 18

Auditory Test Intercorrelations--Pre-test

(N = 55-58)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. Sounds-Pic. Ident.	--	.38*	.10	.19	.15	.13	.11	-.07	-.01	.05	-.01	.09	.10	.19	.02	-.05	.25*	.15	-.08	-.08	.04	.06
2. Sounds Labeling		--	.28*	.41*	.12	.16	.15	.09	.19	.12	.20	.16	.19	.01	.12	.18	.00	-.08	-.04	-.06	.26*	.13
3. Words Repetition			--	.17	.54*	.42*	.03	.25*	.21	.23*	.32*	-.03	-.14	-.04	.24*	-.04	-.06	.07	-.22*	-.26*	-.10	.02
4. Words--Picture Ident.				--	.19	.51*	.19	-.11	.10	-.07	-.01	.01	-.02	.05	.23*	.05	.14	.13	.02	-.09	.14	.02
5. Phonemes					--	.32*	.08	.05	.08	.18	.14	.05	-.04	.13	.10	-.17	.01	.18	-.14	-.12	-.20	-.07
6. Word Pair Discrimination						--	.25*	.03	.13	-.07	.06	-.08	-.22	.11	.27*	-.14	.14	.07	-.01	-.07	-.05	-.11
7. Wepman							--	.15	.19	-.23	.06	-.10	.12	-.08	.03	.00	-.01	-.01	-.05	-.05	-.04	-.09
8. CNMT 1-Syllable								--	.22*	.18	.58*	.15	.09	.20	-.10	-.06	-.06	-.16	-.13	-.09	.03	.14
9. 2-Syllable									--	.24*	.80*	-.04	.05	-.09	-.03	.05	-.20	-.17	-.04	-.08	.03	.00
10. 3-Syllable										--	.67*	.07	.19	.06	.11	.05	-.17	-.17	-.21	-.19	.00	.23*
11. Total											--	.11	.15	.05	.00	.03	-.22	-.24	-.17	-.16	.03	.15
12. Memory--Sounds Recall												--	.27*	.13	.09	.08	-.13	-.12	.03	.05	.27*	.17
13. Recog. A													--	-.10	.17	.51*	-.13	-.28	-.27*	-.19	.18	.29*
14. Recog. B & C														--	-.06	-.22	.40*	.34*	a.	a.	a.	a.
15. Memory--Words Recall															--	.21	.08	.01	-.10	-.20	.06	.11
16. Recog. A																--	-.48	-.52	-.02	-.06	.25*	.22*
17. Recog. B																	--	.69*	.16	.19	.17	.02
18. Recog. C																		--	-.02	-.02	-.05	-.03

Table 18 (continued)

Auditory Test Intercorrelations-- Pre-test

(N = 55-58)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
19. CPT Reac. Time 101-2000 msec.																			--	.86*	.11	-.40
20. CPT Reac. Time 101-1000 msec.																				--	.14	-.26
21. CPT # Resp. 101-2000 msec.																					--	.77*
22. CPT # Resp. 101-1000 msec.																						--

	1	2	3	4	5	6	7	8	9	10	11	12	13	15	16	17	18
Mean	17.59	14.91	24.78	16.12	36.78	28.29	20.22	12.43	13.47	11.69	37.59	5.38	13.38	3.35	13.83	7.23	6.60
S.D.	1.20	2.07	3.07	1.98	4.40	6.29	6.57	2.30	3.93	2.93	6.44	2.07	.85	1.50	3.21	2.62	2.65

*Significant at .025 level

The Memory-Words-Recall score was related to the two word recognition tests and to the Word Pair Discrimination Test.

On the Continuous Performance Test there was a high relationship between the two reaction time scores and between the two number of response scores recorded. These scores are also related significantly to other auditory tests, but the correlations were low.

It should be noted that in the case of two of the CPT scores, the two reaction time scores, low scores were considered better. For all of the other tests, high scores were considered better. Therefore, the negative, rather than positive, correlations of those two CPT scores with the other auditory measures were those considered significant.

Other than the above relationships, the various auditory tests did not seem to be highly related.

Post-test I

The statements made about pre-test auditory score relationships also hold true for the post-test I inter-correlations. See Table 19. The tests in the post-test I auditory recognition area held together even less well than in the previous pre-test matrix, so the *a priori* designations previously given the tests were further weakened in the post-test I matrix.

Only two correlations out of a possible ten were significant. Again, the Word Pair Discrimination Test correlated with three of the five recognition tests but not with the other discrimination test, the Wepman Test. Out of the twenty-one possible memory score correlations, there were five correlations. Apparently various different skills were represented in the auditory tests given.

Pre-test vs. Post-test I

In the pre-test versus post-test auditory I matrix, (Table 20), there was a moderate correlation among three auditory recognition tests; Words-Repetition, Words-Picture Identification, Phonemes, along with the Word Pair Discrimination Test. Scores on those four pre-tests generally predicted scores on post-test I.

There were eight significant positive intercorrelations among the Memory tests, but no reasons for that particular arrangement of relationships could be ascertained. Aside from a few sporadic coefficients, there seemed to be no other clusters of correlations.

Table 19

Auditory Test Intercorrelations--Post-test I

(N = 55-58)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. Sounds-Pic. Ident.	--	-.07	.01	.17	-.05	.28*	.00	-.08	.04	.14	.03	.41*	.14	.05	.06	.11	-.01	.01	.16	.12	-.10	-.20
2. Sounds-Labeling		--	.24*	.22*	.08	.08	.10	-.02	.00	.04	-.01	.02	.03	-.07	.06	.02	-.07	-.10	-.10	-.13	.13	.19
3. Words-Repetition			--	.29*	.42*	.30*	.24*	.06	.29*	-.11	.09	.07	.10	-.07	-.05	.08	.04	.07	.23	.21	-.22	-.21
4. Words-Pic. Ident.				--	.23*	.41*	.20	.01	.01	-.01	-.03	.21	.06	-.12	.08	-.12	.00	.04	-.16	-.15	-.01	.07
5. Phonemes					--	.15	.32*	.17	.04	-.19	.00	.09	-.12	.00	.08	-.04	.01	.04	-.02	-.05	.00	.02
6. Word Pair Discrim.						--	.12	.02	.14	.09	.10	.14	.09	-.11	.05	-.60	-.01	.00	.18	.14	-.03	-.07
7. Wepman							--	.10	-.03	-.14	-.05	-.25	-.08	.04	-.12	-.60	-.02	.03	.07	.07	-.06	-.05
8. CNMT-1 Syllable								--	.13	.12	.51*	.14	-.04	-.09	.20	.01	-.01	-.03	.14	.18	.24*	.19
9. 2 Syllable									--	.07	.69*	.03	.21	-.11	.11	.26*	-.12	-.12	.21	.27	.02	.01
10. 3 Syllable										--	.62*	.24	.13	.20	.09	.04	.05	.04	.22	.22	.05	.00
11. Total											--	.18	.18	-.03	.16	.22*	-.08	-.10	.23	.29	.18	.14
12. Memory-Sounds Recall												--	.13	.19	.41*	-.02	.14	.08	-.04	-.06	.15	.15
13. Recog. A													--	.15	.16	.52*	-.18	-.01	.02	.06	.25*	.18
14. Recog. B & C														--	.14	-.22	.34*	.24*	a.	a.	a.	a.
15. Memory-Words Recall															--	.09	.17	.19	.15	.15	.11	.07
16. Recog. A																--	-.47	-.48	.14	.17	.18	.11
17. Recog. B																	--	.81*	.06	.04	-.02	-.01
18. Recog. C																		--	-.04	-.04	-.10	-.03
19. CPT Reac. Time 101-2000 msec.																			--	.97*	-.22	-.51
20. CPT Reac. Time 101-1000 msec.																				--	-.18	-.42
21. #Resp. 101-2000 msec.																					--	.87*
22. #Resp. 101-1000 msec.																						--
Mean	18.18	15.98	25.05	17.19	36.91	32.49	25.18	12.46	15.14	15.47	42.90	6.00	12.94		3.79	14.01	7.20	7.13				
S.D.	1.14	1.62	2.50	1.70	4.63	4.59	2.85	2.33	2.69	2.52	4.87	2.10	2.01		1.71	3.56	2.44	2.47				

*Significant at .025 level a. not calculated

Table 20

Auditory Test Correlations--Pre-test vs Post-test I
(N = 55-58)

	Post-test																						
Pre-test	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. Sounds-Pic. Ident.	.23*	.39*	.24*	.00	-.02	.10	.15	-.13	.01	.05	-.04	.07	-.02	.03	.09	.04	.06	-.09	-.04	-.03	-.04	-.1	-.05
2. Sounds-Labeling	.12	.43*	.30*	.10	.18	.09	.19	.08	.42*	.00	.27*	.14	.22*	-.02	-.04	.12	.29*	-.20	-.18	.06	.06	.1	.16
3. Words-Repetition	.17	.29*	.48*	.17	.28*	.31*	.20	.08	.19	-.11	.07	.05	.08	.19	.08	-.09	-.08	.12	.00	.04	-.01	-.0	-.06
4. Words-Pic. Ident.	.12	.22*	.23*	.39*	-.08	.27*	.07	.06	.24*	-.05	.14	.07	.24*	-.23	-.14	.03	.10	-.14	-.03	.05	.01	.1	.05
5. Phonemes	.26*	.02	.47*	.39*	.44*	.34*	.13	-.06	.12	-.18	-.09	.06	-.01	.17	.11	-.10	-.15	.00	.04	02	-.01	-.1	-.18
6. Word Pair Discr.	.01	.23*	.33*	.30*	.25*	.65*	.33*	.06	.01	-.08	-.07	-.08	-.07	-.18	.03	-.10	-.25	.11	.12	.09	.02	-.0	-.08
7. Wepman	-.08	.00	.01	.16	.04	.14	.24*	-.06	.36*	.05	.26*	-.05	-.04	.00	-.10	-.12	-.03	-.10	-.23	.10	.14	-.1	-.05
8. CNMT-1 Syllable	-.11	.18	.08	.03	.19	-.10	.12	.28*	.21	-.15	.15	.07	-.04	.01	.13	-.09	.01	.16	-.01	-.05	.01	.1	.22*
9. CNMT-2 Syllable	-.01	.06	-.01	-.08	.07	.16	.09	.23*	.23*	.10	.30*	-.01	-.14	.04	.07	.01	.00	-.02	-.06	.21	.21	-.0	-.03
10. CNMT-3 Syllable	.11	-.10	.24*	-.10	.01	.07	-.03	.04	.10	.08	.09	.28*	.14	.06	.04	-.16	.01	.05	.05	-.02	-.03	.11	.08
11. CNMT-Total	.01	.05	.13	-.09	.12	.09	.08	.26*	.26*	.04	.28*	.14	-.04	.06	.11	-.10	.01	.07	-.02	.10	.12	.08	.09
12. Mem - Sounds Rec.	.02	.22*	-.05	-.04	-.01	-.09	-.11	-.10	.18	-.10	.03	-.03	.20	-.02	.08	-.07	.16	-.06	.03	-.02	.06	-.21	.25*
13. Mem.--Recog. A	-.01	-.10	-.13	-.24	.02	-.12	.00	-.20	.23*	.15	.17	.20	.19	.18	.05	.08	.28*	-.11	-.12	.17	.21	.09	.11
14. Mem.--Recog. B	-.08	.10	.09	.02	.11	.03	-.08	.02	-.05	.10	.01	.03	-.12	.14	.13	.02	-.34	.13	.19	-.02	-.01	.07	.0
15. Mem.--Recog. C	-.05	.09	.13	.16	.18	.09	-.02	.10	-.16	-.08	-.12	-.04	-.10	.11	.21	.11	-.26	.10	.10	.21	.20	.04	-.0
16. Mem.-Words-Rec.	-.03	.18	.27*	-.07	-.10	.24*	-.02	-.12	.22*	-.11	.00	-.06	.00	-.19	-.29	-.03	.03	-.12	-.06	.01	.00	.01	.0
17. Recog. A	.03	-.02	.10	-.23	.01	-.06	.10	.07	.23*	.19	.29*	-.10	.28*	-.11	-.19	-.08	.65*	-.42	-.45	.37	.38	.17	.0
18. Recog. B	-.11	.11	.04	-.01	.05	.08	-.08	-.14	-.17	-.10	-.24	.04	-.08	.16	.27*	.17	-.25	.31*	.27*	-.07	-.14	.10	.1
19. Recog. C	.05	.01	.20	.22*	.00	.08	-.06	-.20	-.11	-.11	-.25	.11	-.17	.24*	.24*	.19	-.34	.52*	.49*	-.03	-.06	-.11	-
20. CPT R.T. 101-2000 msec.	-.02	.03	-.04	-.10	-.02	-.04	.01	.16	-.04	-.31*	-.14	-.16	-.11	-.06	.08	.12	.05	-.03	-.07	.22*	.20	.05	-.0
21. CPT R.T. 101-1000 msec.	-.18	-.01	-.07	-.10	.05	-.05	-.10	.30*	.00	-.20	.00	-.03	-.11	-.01	.14	.21	.05	.00	-.14	.26*	.24*	.12	-.0
22. CPT # R. 101-2000 msec.	-.24	.24*	-.14	-.13	.00	-.17	.00	-.03	.08	.15	.19	-.15	.18	.05	.06	-.07	.19	-.02	.03	-.07	-.03	.60*	.5*
23. CPT # R. 101-1000 msec.	-.24	.14	-.05	-.05	.06	-.15	.06	-.03	.07	.24*	.23*	-.04	.18	.13	-.03	-.09	.11	.09	.09	-.20	-.14	.57*	.6

*Significant at .025 Level

Relationships of the tests before and after treatment were not clear in most cases.

Relationship of Reading Tests with Auditory Tests

Pre-test

There were few correlations between the auditory and reading tests in the pre-test matrix (Table 21). The Memory-Words-Recall Test showed a significant relationship with three of reading tests, the Gates PPR Test, the Gates Oral Reading Test, and the Gates Sight Vocabulary Test. Perhaps ability to recall or to memorize for recall may have been a common factor in early reading skills.

Post-test I

On post-test I scores (Table 22), Words-Repetition correlated with most of the reading tests. Auditory awareness of word beginnings and endings apparently related to achievement in global reading or word analysis skills.

The Phoneme Test correlated with all the subpart scores and the total score of the Roswell-Chall Word Analysis Test. Apparently some knowledge of words was common to both tests. None of the other auditory and reading tests showed any significant correlations on post-test scores.

Pre-test vs. Post-test I

Relationships found between the auditory and reading tests are reported in Table 23. The Word Pair Discrimination pre-test was related to the Roswell Chall Sounds subpart and total post-test scores, again perhaps showing knowledge of sounds as common test variance. Some of the memory tests correlated with some of the reading tests, but there was no definable pattern. In summary, few of the reading or auditory tests predicted scores on the other battery from the pre-test to the post-test I period.

Bender-Gestalt Correlations

The four pre-test scores of the Bender-Gestalt (Form I, Matching and Memory Tests, and Form II, Matching and Memory Tests), were correlated with the reading and auditory batteries given in the post-test I period. As the Bender-Gestalt was a visual test, there were no hypotheses made about its relationship to the reading and auditory skills. Therefore the test was not included in the pre-test vs. pre-test or post-test I vs post-test I correlation tables. The test was included in the pre-test vs. post-test I correlation table to see whether it would be a predictor of the other tests. See Table 24 for results.

Table 21

Auditory and Reading Test Correlations - Pre-Test
(N = 55-58)

	Gates PPR Standard Score	Gates PPR Weighted Score	Gates Oral Reading	Gates Sight Vocabulary	Roswell-Chall Sounds	Roswell-Chall Words	Roswell-Chall Syllables	Roswell-Chall Total Score
Sounds-Pic.Ident.	.10	.13	-.15	-.25	.02	-.03	-.17	.02
Sounds-Labeling	.03	-.02	.09	.09	.06	.17	.05	.09
Words-Repetition	-.11	-.13	-.18	-.12	-.12	-.25	-.21	-.18
Words-Pic.Ident.	.10	.02	.07	.10	.18	.13	.03	.17
Phonemes	-.09	-.13	-.01	-.08	-.18	-.12	-.34	-.24
Word Pair Disc.	-.01	-.10	.14	-.01	.18	.02	.03	.16
Wepman	.06	-.16	.06	-.02	.14	.15	.06	.14
CNMT 1-Syllable	.16	.09	-.13	.09	-.02	-.24	.08	-.04
2-Syllable	.09	.07	.11	.05	-.09	-.12	.23	-.09
3-Syllable	.12	.19	.01	-.05	-.13	-.20	-.18	-.17
Total	.17	.16	.03	.04	-.12	-.26	-.04	-.15
Memory-Sounds-Recall	-.01	.17	-.06	-.13	.03	-.05	-.01	.02
Recog.A	-.11	-.07	.11	-.08	.10	.16	.09	.12
Recog.B+C	.29*	.43*	.05	.11	-.07	-.02	-.04	-.07
Memory-Words-Recall	.36*	.26*	.34*	.30*	.06	.09	.15	.09
Recog.A	.02	-.01	.26*	.18	.03	.19	.10	.08
Recog.B	.23*	.18	-.03	.09	.20	.20	.19	.23*
Recog.C	.01	.02	-.11	.08	.05	.08	-.14	.02
CPT Reac. Time - 101-2000 msec.	.12	.10	.23	.12	.17	.15	.17	.20
Reac. Time - 101-1000 msec.	.03	.05	.11	.04	.20	.14	.17	.22
# Resp. - 101-2000 msec.	.11	.20	.18	.17	.22*	.04	.26*	.24*
# Resp. - 101-1000 msec.	.05	.15	.04	.13	.08	-.11	.07	.06

* Significant at .025 level

Table 22

Auditory and Reading Tests Correlations - Post-Test I
(N = 55-58)

	Gates PPR Standard Score	Gates PPR Weighted Score	Gates Oral Reading	Gates Sight Vocabulary	Roswell-Chall Sounds	Roswell-Chall Words	Roswell-Chall Syllables	Roswell-Chall Total Score
Sounds-Pic.Ident.	-.06	-.04	-.12	-.19	-.18	-.22	-.17	-.22
Sounds-Labeling	.21	.13	.06	.04	.25*	.12	.23*	.25*
Words-Repetition	.27*	.20	.27*	.27*	.41*	.18	.27*	.37*
Words-Pic.Ident.	.02	-.04	.08	.08	.14	.24*	.19	.20
Phonemes	.20	.10	.21	.23*	.30*	.36*	.36*	.38*
Word Pair Disc.	-.02	-.07	.04	.03	.23*	.07	.07	.18
Wepman	.20	.10	.00	.07	.18	.23*	.13	.21
CNMT 1-Syllable	.13	.12	-.01	.13	.15	.06	.10	.13
2-Syllable	.10	.05	-.04	.07	-.09	-.18	-.03	-.12
3-Syllable	-.10	-.01	-.13	-.01	.21	.08	.13	.14
Total	.03	.05	-.10	.09	.10	-.16	.06	.02
Memory-Sounds-Recall	-.08	-.04	-.05	-.11	.07	-.14	-.02	-.01
Recog.A	.03	.02	-.17	-.02	-.01	-.11	-.11	-.06
Recog.B+C	-.22	-.19	-.30	-.31	.02	-.09	-.18	-.05
Memory-Words-Recall	.03	.04	-.08	-.01	-.06	.09	-.02	.01
Recog.A	.19	.21	.02	.13	.01	.04	.00	.02
Recog.B	-.09	-.11	.02	.05	.11	.09	.10	.12
Recog.C	-.10	-.16	-.03	.04	.06	.01	-.01	.04
CPT Reac. Time - 101-2000 msec.	.04	.10	-.05	.02	.12	-.01	.01	.07
Reac. Time - 101-1000 msec.	.02	.09	-.10	-.02	.11	-.04	-.07	.04
# Resp. - 101-2000 msec.	.24*	.17	.15	.22*	.25*	.26*	.21	.28*
# Resp. - 101-1000 msec.	.22*	.14	.17	.20	.28*	.26*	.21	.30*

* Significant at .025 level

Table 23 A

Auditory - Reading Correlations - Pre-test vs. Post-test I
(N = 55-58)

Pre-test	Post-test Gates PPR Standard Score	Gates PPR Weighted Score	Gates Oral Reading	Gates Sight Vocabulary	Roswell-Chall Sounds	Roswell-Chall Words	Roswell-Chall Syllables	Roswell-Chall Total Score
Sounds-Pic.Ident.	.07	.09	.07	.01	.15	-.02	.06	.10
Sounds-Labeling	.32*	.17	.03	.07	.07	.00	.08	.06
Words-Repetition	-.06	-.11	-.06	-.19	.19	-.02	.06	.13
Words-Pic.Ident.	.17	.09	.14	.18	.03	.01	.13	.06
Phonemes	-.07	-.14	.08	-.03	.12	.05	.09	.11
Word Pair Disc.	.05	-.03	.14	.08	.30*	.16	.22*	.29*
Wepman	-.04	.01	-.02	-.02	-.12	-.01	.02	-.07
CNMT 1-Syllable	.04	.02	.02	-.01	.12	-.01	.09	.09
2-Syllable	-.06	-.13	-.19	-.06	-.09	-.21	-.04	-.13
3-Syllable	.14	.13	.06	-.01	.13	-.17	.02	.03
Total	.04	-.01	-.07	-.05	.05	-.21	.01	-.03
Memory-Sounds-Recall	-.01	-.07	-.08	-.11	.13	-.16	-.09	.00
Recog.A	.03	.06	.02	-.01	.20	-.05	.04	.12
Recog.B	.24*	.25*	.23*	.23*	.31*	.17	.14	.29*
Recog.C	.30*	-.08	.05	.03	.24*	.12	.04	.19
Memory-Words-Recall	-.01	.28*	.31*	.21	.19	.12	.21	.21
Recog.A	.31*	.36*	.15	.23*	.23*	.11	.13	.21
Recog.B	.12	.08	.22*	.28*	.22*	.30*	.33*	.31*
Recog.C	.03	-.01	.14	.16	.10	.23*	.16	.17
CPT Reac. Time -								
101-2000 msec.	.12	.10	.22*	.12	.17	.15	.17	.20
101-1000 msec.	.03	.05	.11	.04	.20	.14	.17	.22*
# Resp. -								
101-2000 msec.	.11	.20	.18	.17	.22	.04	.26	.24
# Resp. -								
101-1000 msec.	.05	.15	.04	.13	.08	-.11	.07	.06

* Significant at .025 level

Table 23B

Auditory-Reading Correlations--Pre-test I vs Post-Test

(N = 55-58)

Post-test

Pre-test	Sounds-Pic. Ident.	Sounds-Labeling	Words-Repetition	Words-Pic. Ident.	Phonemes	Word Pair Disc.	Wepman	CNMT 1-Syllable	2-Syllable	3-Syllable	Total	Mem. Sounds Recall	Recog. A	Recog. B	Recog. C	Mem. Words Recall	Recog. A	Recog. B	Recog. C	CPT Reac. Time-- 101-2000 msec.	101-1000 msec.	# Resp. 101-2000 msec.	# Resp. 101-1000 msec.
23. Gates PPR Standard Score	.01	.18	.05	-.07	.01	.03	-.14	.03	.07	-.02	.04	-.05	-.13	-.16	-.11	-.01	-.03	-.07	-.12	-.06	-.09	.11	.11
24. Gates PPR Weighted Score	.03	.15	-.01	-.21	-.04	.00	-.27	.05	.07	-.04	.04	-.09	.01	-.11	-.13	.05	.00	-.04	.01	-.07	-.07	.14	.15
25. Gates Oral Reading	-.14	-.04	.08	-.21	.31*	-.06	.18	.10	.11	-.04	.09	-.10	-.21	-.13	-.08	.00	-.09	.02	.10	.09	.05	.03	.01
26. Gates Sight Vocabulary	-.24	.03	.16	-.01	.24*	-.19	.04	.20	.08	-.11	.07	-.13	-.20	-.13	-.25	.06	.05	.10	.03	-.08	-.10	.23	.26
27. Roswell-Chall Sounds	-.41	.12	.02	-.06	.06	-.18	.21	.22*	-.12	-.03	.03	-.23	-.06	-.06	-.06	-.11	-.04	.17	.16	-.03	-.04	.07	.16
28. Roswell-Chall Words	.10	.03	.01	.17	.17	.06	.00	.02	-.12	.14	.00	.23*	.05	-.05	.00	.20	.18	-.04	-.11	.08	.01	.09	.02
29. Roswell-Chall Syllables	-.43	.07	-.16	-.27	.10	-.14	-.03	.15	.19	-.07	.18	-.16	.01	-.14	-.03	.11	.16	-.03	-.02	-.17	-.17	.16	.25
30. Roswell-Chall Total Score	-.41	.12	-.01	-.08	.10	-.17	.17	.22*	-.08	-.01	.06	-.19	-.04	-.09	-.06	-.04	.03	.13	.11	-.05	-.07	.10	.19

*significant at .025 level

Table 24

Correlations of Bender-Gestalt Pre-test Scores with Post-test I Scores

	Pre-test Bender-Gestalt			
Post-test	I Mem.	I Match	II Mem.	II Match
Gates PPR Standard Score	-.01	.29*	-.05	.08
Gates PPR Weighted Score	-.13	.24*	-.09	.08
Gates Oral Reading	-.02	.15	-.13	.03
Gates Sight Vocabulary	-.05	.28*	-.15	-.02
Roswell-Chall Sounds	.12	.24*	.18	.02
Roswell-Chall Words	-.07	.20	-.02	.04
Roswell-Chall Syllables	.03	.28*	.06	-.06
Roswell-Chall Total Score	.06	.28*	.12	.01
Bender-Gestalt I - Mem.	.19	.06	.10	.07
Bender-Gestalt I - Match	.35*	-.03	.13	.01
Bender-Gestalt II - Mem.	.01	-.02	.19	.25*
Bender-Gestalt II - Match	.02	-.12	.11	.04
Sounds-Picture Identification	.04	.00	.21	.14
Sounds-Labeling	.12	.27*	.33*	.28*
Words-Repetition	-.01	.12	.10	-.10
Words-Picture Identification	.00	.10	.02	.17
Phonemes	-.03	.04	.03	-.08
Word Pair Discrimination	.14	-.16	.10	.04
Wepman	.10	-.02	.16	-.07
CNMT - 1-syllable	-.11	-.07	-.09	.05
2-syllable	-.06	.05	.02	-.02
3-syllable	-.03	-.12	.13	.09
Total	-.09	-.12	.02	.04
Memory-Sounds-Recall	-.02	.02	.04	.33*
Recognition A	.18	.18	.01	-.03
Recognition B	.06	.00	.23*	.16
Recognition C	.11	-.08	.25*	.14
Memory-Words-Recall	.12	.04	-.02	.13
Recognition A	-.12	.09	-.12	-.12
Recognition B	.12	-.01	.04	-.06
Recognition C	.30*	.06	.06	-.12
CPT Reaction Time 101-2000 msec.	-.15	-.13	.08	-.25*
Reaction Time 101-1000 msec.	-.16	-.14	.05	-.24*
# Responses 101-2000 msec.	.05	.10	.03	.10
# Responses 101-1000 msec.	.09	.17	.01	.17

* Significant at .025 level

Three auditory tests were predicted by the Bender-Gestalt test: the Sounds-Labeling, the Auditory Memory Test, and the two reaction time measures of the CPT. Perhaps some memory variable was common to both the Auditory Memory and the Bender-Gestalt tasks and an attention factor common to the CPT scores and the Bender scores. No satisfactory explanation can be found for the relationships of Sound-Labeling with the Bender-Gestalt test.

Form I, Matching of the Bender-Gestalt Test was found to predict six of the eight reading scores. This form seemed unique in that it was the only one to predict reading scores, yet not to predict any of the Auditory Memory battery.

In summary, the correlation matrices of the auditory and reading tests for the pre-test, post-test I, and the pre-test vs. post-test I periods showed little evidence for strong relationships among the tests. Among the reading tests, significant intercorrelations were found among most of the tests at the various testing periods, especially at post-test I. The four auditory areas designated *a priori* for the auditory tests were not supported by the auditory test matrices for either of the testing periods. Some of the auditory recognition tests and the Word Pair Discrimination Test seemed to be related at each of the testing periods, but few other clusters of tests were found.

In the pre-test period the results of the correlation of auditory and reading scores indicated that one of the memory tests was related to several of the reading tests. In the post-test I period two auditory recognition tests showed positive relationships to the reading tests. Few of pre-test auditory or reading test scores predicted post-test I scores from the other battery.

The pre-test Bender-Gestalt scores predicted both reading and auditory post-test I scores.

E. Factor Analysis

Despite the generally low correlations found in the matrices described in the preceding section, a factor analysis was obtained for the reading and auditory tests. It was hoped that the factor analysis would help to define further the relationships of the auditory and reading tests to each other as well as to themselves.

The pre-test scores of 90 children were used in the factor analysis. Fifty-six of the children were from Study I and the remaining 34 children were from Study II. All of the auditory and reading scores were included in the factor analysis, with the following changes. The Roswell-Chall total score was excluded as the factor analysis could not include any tests scores composed of any of the other scores.

The Continuous Performance Test, Reaction Time 101-1000 milliseconds, was excluded as the Reaction Time 101-2000 overlapped with that measure. In addition, the intelligence score, as measured by the Lorge-Thorndike Intelligence Scale, was included in the factor analysis.

A total of 26 variables was analyzed by the Thurstone centroid method. Six of the resulting factors were significant, using Tucker's phi, and therefore those six factors were rotated by the varimax method (Harman, 1960).

Four factors were found, two of which were meaningful for the study.[1] Table 25 shows the composition of the latter two factors. As can be seen, Factor 2 is a reading factor.

Table 25

Factors 2 and 4 from the Six-Factor Rotation of the Auditory and Reading Tests.

Variable	Factor Loadings Factor 2	Factor 4
Gates Oral Reading	.67	
Gates Sight Vocabulary	.66	
Roswell-Chall Sounds	.75	
Roswell-Chall Words	.51	
Roswell-Chall Syllables	.65	
Words-Repetition		.65
Words-Pic. Ident.		.57
Phonemes		.54
Word Pair Disc.		.65
CNMT		.53
Total Variance	.17	.18
Common Variance	.23	.22

It included all of the reading test scores except the Gates Primary Paragraphs Test. The same grouping was also found in the pre-test correlation matrix. This factor probably represents some combination of decoding and meaning skills, since the test included in the grouping deal with word parts, words, and connected reading.

Factor 4 seems to be an auditory factor, and might be named a word or word-part identification ability. The factor groups together tests which call for identification or discrimination of words. The assumption that the auditory tests measured four distinct areas was not supported by the factor analysis, as it had not been by the correlation matrices already reported. In Factor 4 the Word Pair Discrimination Test was closely related to three of the tests designated as recognition tests. In addition one of the designated attention tests (CNMT) was also associated with the factor. That test required recognition of words with different amounts of masking, so perhaps on that basis it could be called an identification or recognition test.

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[1] The entire factor table may be found in Appendix N.

The other two factors, not included on Table 25, seemed to be minor factors. One included the three Continuous Performance Test scores. The other factor included the two forms of the Bender-Gestalt II tests. Also included in the latter factor was the Sounds-Picture Identification Test; no explanation for the relationship of that test with the Bender grouping can be given.

In summary, a reading factor, perhaps a combination meaning-decoding factor, and an auditory factor, perhaps a word or word-part identification factor, were found. Each factor accounted for less than 20% of the total variance, so were not considered strong factors. No factors were identified in which auditory and reading scores were mixed. Much of the variance was unaccounted for in the two named factors, so apparently many other skills were also measured in the reading and auditory tests.

F. Error Analyses

Another subsidiary analysis, error analyses of items on some of the reading and auditory tests, was undertaken. It was hypothesized that improvement in skills not shown in the statistical analyses might still be shown by the patterns of change in errors made on items from the pre-test period to the post-test I or to the post-test III period. In other words, with increase in skill, certain errors on a particular test might appear less frequently, or other errors, considered to be higher level errors, might possibly occur relatively more frequently.

Accordingly, categories for errors types were devised for each test so analysed, and tabulations were made of the frequency of occurrence for each of the four treatment groups (including the control groups as a treatment group). No tests of significance were used in the analyses, so the results are only suggestive of any trends in the data. Results of the error analyses are reported below for each test.

Gates Oral Reading Test

This test required the reading of the first four paragraphs, no matter how difficult for the child. Subsequent paragraphs were to be read if the child's error rate did not exceed a certain level. Therefore, the test was analyzed for errors on the first four paragraphs as well as for paragraphs one through five.

The errors on the test were designated as follows; using the error categories from the test;

a. omissions of words
b. additions of extra words
c. repetition of words
d.. misprounounciation of words
    1. reversals
    2. wrong beginnings
    3. wrong middles
    4. wrong endings
    5. two or more parts wrong
    6. all parts wrong

The median number of errors in each category was found for each of the four treatment groups. The mean number of errors was not used as there were extreme scores which would have unduly influenced the measure of central tendency.

In the analysis of paragraphs 1-4, the errors made most often fell under a. omitted, d. mispronounced, (the sum of d1 through d6) and d5 two or more parts wrong. The other categories showed few errors, so were not analyzed.

In category a. omissions, there was a decrease in the median number of errors from pre-test to post-test III. The largest decrease came from pre-test to post-test I, while from post-test I to post-test III the omission category went to zero. No treatment group differences were noted. As scores increased on the test, therefore, fewer omission errors were made, until that type of error was not noted at all by post-test III.

In category d. misprounciations, the reading-play group had a large decrease in errors from pre-test to post-test I, while the others had a smaller decrease. However, the reading-play group had a higher initial median number of misprounciations. There were continued decreases until the post-test III period. The groups ended at about the same median score with the exception of the auditory play group whose median score was somewhat higher.

In error type d5, two or more parts wrong, there were some initial differences by groups on the pre-test, but by post-test I the differences had disappeared. By post-test III that type of error had also been reduced to about zero for all of the groups.

In paragraphs 1-5, similar kinds of changes in error patterns were shown, as reported above, so apparently errors on paragraph 5 were not much different from those made on the first four paragraphs.

In summary, there were no treatment group differences in the kinds of errors made on the post-tests, or in the changes in errors after treatment. In general, there was a decrease with time in the number of words omitted and mispronounced.

Gates Sight Vocabulary Test

For this test the responses to items were categorized as follows:

1. number right
2. number refused
3. number wrong
    a. reversals
    b. wrong beginnings
    c. wrong middles
    d. wrong endings
    e. wrong in two or more parts
    f. all wrong
4. number tried (categories 1 plus 3)

Each child's pre-test score was subtracted from his post-test II score for each category, and then the mean difference score for each treatment group was computed.

There were differences found among the treatment groups at the various testing times in only two of the error type categories, number right and number tried. These two categories are related, since the test is ended after six consecutive errors are made. As the number right score is the one considered in analysis of covariance, the differences found in these two categories are not discussed. The other categories did not show differences among the groups; this may be due to the small number of items tabulated in the other categories. Apparently then, error patterns on this test did not change much for any of the groups over time.

Gates Primary Reading Test-Paragraph Reading

The task on this test is to put a particular mark in a particular position in relation to a particular object, according to the directions read in the item. Three types of errors can thus be made on the items; marking the wrong object, using the wrong mark or putting the mark in the wrong position.

The various combinations of the three errors were listed in the six categories shown below. The categories were rated as to their "correctness," with category a. being the most "correct" and category e. being the "wrong" category. Category a. is the standard scoring method for the test.

Degree of Error

	Object	Mark	Position
a.	right	right	right
b.	right	wrong	right
	right	right	wrong
c.	right	wrong	wrong
	wrong	right	right
d.	wrong	right	wrong
	wrong	wrong	right
e.	wrong	wrong	wrong
f.	omitted item		

For the error analysis the mean difference scores from pre-test to post-test I and from pre-test to post-test III were found for each of the four groups for each error category listed above. No differences were found among the groups on any of the categories for either of the time intervals. At both post-test I and post-test III periods the groups varied most in category c., but the differences did not seem significant.

Words-Repetition

Each of the incorrect sounds given for an item were tabulated for the treatment groups for the pre-test and the post-test III periods. Most of the errors so noted occurred only once or twice. The most frequent error, omitting the ed ending, occurred seven times within a group; a few other errors occurred five times. Only three phoneme substitutions were common to all of the treatment groups. Thus, the error count was too small to make any comparisons for specific substitutions among the groups.

The errors for items were also classified as to whether they occurred in the beginning, middle or end of a word. On beginning errors at post-test III testing, all treatment groups made about the same number of errors, except for the control group, which made at least nine fewer beginning errors than any of the other groups. All groups made about the same number of pre-test and post-test III middle errors, except for the control group which again made fewer errors at each testing time. Except for the control group which again had a lower number of errors, the groups had comparable pre-test scores for ending errors. The treatment groups with the exception of the reading-play group, made about the same amount of improvement by post-test III in ending errors.

In summary, on the Words-Repetition Test few common errors were made by all of the treatment groups. When errors were classified as beginning, middle, or ending errors, only the control group seemed to differ from the other treatment groups in number of errors made in each category.

Phonemes Test

The number of and types of errors on this test were first tabulated for the total sample of children. For those eight items on which at least 21 children made errors, an item tabulation was then done by each treatment group for pre-test and post-test III scores. An improvement score was found for each item,by group, by substracting post-test III errors from pre-test errors.

On only four of those eight items did the treatment groups vary from each other by an improvement score of at least five. The variations by treatment groups on each of items (vi), (ib) and (bri) seem to be accounted for by the large initial differences among groups in numbers of errors on the pre-test. On item (gli), although both the reading-auditory and the reading-play groups initially had the same number of errors, the reading-auditory group showed the most improvement. These differences, however, were small and probably were not significant.

Word Pair Picture Discrimination Test

On the Word Pair Picture Discrimination item analysis, the number of errors for each item were tabulated by treatment group for the pre-test and post-test III, and an improvement score was found. Only seven items showed a range of six to eight points of improvement. Of those seven items, four items required word ending discriminations. The other three items required discrimination of middle parts of words. None of the treatment groups could be differentiated from each other in improvement on those items. A frequency count was also made of beginning, middle and final errors, by each treatment group, for the pre-test and post-test III, and an improvement score was obtained. Results showed that there were no differences by treatment group for the three kinds of errors.

Wepman Discrimination Test

Of the 40 items on the Wepman Discrimination Test, 26 were analysed, those 13 pairs of words in which the consonants were presented in both beginning and final position. The four items with middle vowel differences and ten pairs of identical words were omitted from the analysis.

The beginning and ending consonant errors for the 13 word pairs were tabulated by treatment group. Post-test III scores were subtracted from pre-test scores to get an improvement score for each item. Results showed that there was a small range of improvement scores and there appeared to be no large differences among the treatment groups.

Memory-Words and Sounds-Recall

On the Memory test, for the pre-test, post-test I and post-test III, a frequency count of those items recalled was made. Results showed that the position of the word in the list apparently was a factor in recall. For both the word and the sound lists at each of the times of testing, the first word in the list was remembered most often. In eight out of the 12 presentations of the list (four lists presented at each of three testings), the last word was least frequently remembered. On the other four presentations, the last word in the list was the second or third least often remembered word in the list.

In summary, the error analyses of the various reading and auditory tests showed that the treatment groups did not differ much in number of different types of errors on the post-tests. The differences which were sometimes found were explainable by the initial differences on the pre-tests. Thus the error analyses tended to support the statistical analysis in not showing any group differences.

G. Summary

The quantitative analyses, including the analysis of covariance, the pre-test to post-test I improvement, the correlation matrices, the factor analysis, and the item error analyses were undertaken to see whether the hypothesis was supported as well as to give subsidiary information about the variables in the study. From the analyses no direct support was given for the hypothesis, that is no treatment group was shown to facilitate reading achievement, either immediately after the treatment period or at the other testing times. The error analyses of the items also supported the findings that there were no group differences. However, three of the reading tests did show improvement from post-test I or post-test II to post-test III, for the children in the three experimental groups. Some interactions of the variables, especially tutor by treatment and ethnic group by treatment, were shown to be related to the reading and auditory scores.

The correlation matrices and the factor analysis showed some moderate relationships among some of the tests, with the fewest relationships between the auditory and reading tests. A reading factor and an auditory factor was identified in the factor analysis, but most of the variance of the tests were unaccounted for in those factors.

V

Supplementary Evaluation of the Data

In addition to the quantitative data presented in Chapter IV, other methods of evaluation of the program were undertaken. Since the data analyses did not show strong evidence for the hypothesis, the project staff felt that a number of factors unmeasured in the quantitative analyses might be possible influences on the reported results. Evaluation was undertaken of factors judged to have facilitated or hindered the reading and auditory learning in the study. In view of the lack of support for the study's hypothesis, it was felt that these supplementary evaluations might give additional information and thus assume some importance in the total evaluation of the study's results.

The evaluations reported in the present chapter were based on rating scales and checklists as well as on material from evaluation sessions undertaken by the staff. In order to give structure to the evaluative efforts, tutor observation and judgment were quantified whenever possible in the form of rating scales and checklists. Although some attempt was made to relate the resulting data to the quantitative data already reported, the primary function of the evaluations was as guide to a discussion of those aspects of the program not measured statistically. The staff recognized that such evaluations were subject to all the shortcomings of any subjective measures: thus, only general tentative interpretations were made from the evaluations.

The evaluations were organized around four topics; a. evaluation of the auditory curriculum; b. evaluation of pupil progress; c.. evaluation of pupil characteristics; and d. evaluation of teacher attitude toward the treatment groups. Each evaluation is presented below.

A. Evaluation of the Auditory Curriculum

Several questions concerning the auditory curriculum were discussed by the staff, such as its nature and sequence, the expected transfer of auditory skills to reading, and the amount of time spent on the program. Each is discussed below.

1. Appropriateness of a developmental auditory program. As stated in the description of the curriculum, the auditory treatment was a developmental program designed to teach those auditory skills which appeared to be closely related to reading. In the post-treatment evaluation the question was raised as to whether or not a remedial auditory program would have proved more effective than a developmental one.

For one thing the children in the study were not beginning readers, but were children who had been unsuccessfully exposed to two and one-half years of school reading instruction, instruction which included many of the skills in the study's auditory curriculum. They possessed disconnected bits and pieces of both auditory and reading skills but did not know how to use them effectively. These children were grouped for treatment by similarity of reading skills and deficiencies; performance on the auditory tests administered at the beginning of the program was not taken into account in grouping, and all were given the same auditory instruction. The tutors felt that there were wide individual differences in auditory skill levels within groups and that all children probably did not profit equally from the developmental program. Some children could have skipped parts of the program, while others needed more practice on particular skills. In evaluating the program the tutors suggested that strict adherence to the sequence may have hindered rather than helped learning with these particular children.

In summary, then, since one of the goals of the study was to fill in the gaps in the children's auditory skills, perhaps the auditory as well as the reading treatment should have been remedial.

Also the children in the study appeared to have little observable interest in the content of the auditory program, which is not surprising considering their past academic experience. In order to try to spark their interest, it was necessary to be aware of and meet their immediate needs for knowledge--needs which did not necessarily correspond to the logical developmental sequence of auditory skills. The tutors felt that within the general developmental framework laid down for the auditory curriculum it would have been desirable to allow more flexibility in the sequence in which the skills were taught. Rather than postponing the teaching of a particular skill until the proper place in the sequence, it would possibly have been more profitable to teach it at the point at which it was needed in order to dramatize to the children its usefulness as a tool in unlocking words in reading. For example, vowel sounds might appropriately have been introduced after only a few rather than the majority of consonant sounds had been mastered, so as to be able to relate individual sounds to the structure of meaningful whole words as early as possible. Hopefully such an arrangement would make learning of isolated letter sounds more meaningful to the children and thus facilitate transfer of learning.

2. Lack of opportunity for transfer of auditory skills to reading. In planning the study it was hypothesized that elimination of deficiencies in auditory skills would result in the automatic transfer of these skills to learning-to-read skills. However, at an early stage in the teaching the tutors observed that such transfer generally did not seem to be taking place. Although the majority

of the children appeared able to learn specific auditory skills such as consonant sounds, few appeared able to transfer them to reading without considerable help. The tutors felt that the lack of transfer might have been due in large part to the absence of direct instruction and to practice in using the auditory skills in a reading situation. The children seemed unable to make generalizations about skill use on their own. Even with knowledge of the auditory skills they seemed to ignore use of them in the reading situation, using instead their accustomed methods of word attack - sight vocabulary and guessing.

Because of the original assumption regarding automatic transfer, no attempt was made to coordinate the auditory skills with the skills being taught in the reading sessions. As a result, it was only coincidental that on any given day a child who was receiving both auditory and reading instruction would be dealing with material in the reading sessions which gave him the opportunity to apply his auditory skills. Also, in the reading sessions the need often arose to teach auditory skills which had not yet been covered in the auditory program. The tutors felt that this separation of auditory and reading instruction was both artificial and confusing to the child and probably hampered his reading progress. Also, in planning their reading lessons the tutors could not make the most effective use of the children's previous learning.

This artificial separation of skills seemed even more apparent in the auditory-only treatment group which received reading instruction only in the classroom, thus making remote the situation to which they were expected to transfer skills. The children in the study who received both auditory and reading training at least had the advantage of having their auditory lesson precede or follow their reading lesson, as well as having the same teacher present for both.

This conclusion was not completely borne out by the results of the quantitative analysis, which indicated that the Puerto Rican children receiving auditory-only treatment made improvement in reading while those receiving both auditory and reading treatment did not improve in reading, as discussed in Chapter IV. However, it is possible that other factors were at work to influence those results.

The tutors suggested that a coordinated rather than separated auditory and reading treatment which afforded opportunity for immediate and direct practice of auditory skills in a reading situation might produce more widespread gains in reading achievement. It was on the basis of these conclusions that Study II was designed to test the value of a combined reading-auditory program.

3. Adequacy of time devoted to the auditory curriculum. The auditory curriculum was presented in 50 sessions of 35 minutes each. The tutors agreed that 50 sessions were probably sufficient to cover

the designed curriculum. This feeling prevailed in spite of the fact that all of the skills in the curriculum had not been thoroughly mastered by the end of the treatment period. The children seemed to lose interest in the auditory curriculum as time progressed, which undoubtedly resulted in less efficient learning. The tutors questioned whether optimum use had been made of the 29 hours of time devoted to the development of auditory skills. There was a strong feeling that the same amount of time spent on a program in which the reading and auditory instruction were coordinated would have produced more effective learning.

B. Evaluation of Pupil Progress

At the end of the 50 treatment sessions each child was evaluated by his tutor for the amount of his auditory skill learning observed to have taken place during the reading and auditory programs. See Appendix O for a copy of the Evaluation of Child's Non-Measurable Progress. This evaluation was undertaken in addition to the post-treatment testing because of the tutors' feelings that in many cases the children appeared to learn more auditory skills than they were able to demonstrate when given the post-tests.

The tables which follow present the results of this evaluation for the three treatment groups for two of the auditory skills--consonant sounds and short vowel sounds. These two skills were selected for evaluation because a high proportion of the program time had been devoted to them. The skills were specific and easy-to-measure ones which had been taught by all tutors with little variation of method. Also, direct comparisons of skills taught and skills tested could be made using pre-and post-treatment measures of the Roswell-Chall Word Parts Test-Sounds.

In Table 26 percentages are given by treatment group for those children who learned the skills, those children who were judged capable of applying the skills to reading without help, and those children who independently applied the skills to reading. [1]

For comparison purposes, Table 27 presents comparably organized pre-test and post-test I measures of knowledge of consonant and short vowel sounds taken from the Roswell-Chall Sounds Test. As can be seen, there were no sizeable differences between the two auditory groups in terms of pre-treatment knowledge of consonant sounds. The children

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[1] Three ratings were possible: 1. knows all or almost all of the sounds; 2. knows more than half of the sounds; 3. knows less than half of the sounds.

Table 26

Tutor Judgments of the Extent to which Three Treatment Groups Learned and Applied Selected Auditory Skills to Reading After 50 Treatment Sessions
(N=36)[a]

	Auditory-Reading (N=13)[a]						Auditory-Only (N=10)[a]						Reading-Only (N=13)					
	Knows All or Almost All		Knows At Least Half		Knows Less Than Half		Knows All or Almost All		Knows At Least Half		Knows Less Than Half		Knows All or Almost All		Knows At Least Half		Knows Less Than Half	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
A. Has Skill																		
Consonant Sounds	13	100	--	--	--	--	10	100	--	--	--	--	9	69	3	23	1	8
Short Vowel Sounds	6	46	4	31	3	23	7	70	3	30	--	--	3	23	4	31	6	46
B. Can Apply To Skill To Reading																		
Consonant Sounds	13	100	--	--	--	--							9	69	3	23	--	--
Short Vowel Sounds	6	46	2	15	--	--							3	23	4	31	--	--
C. Applies Skill Independently																		
Consonant Sounds	10	77	--	--	--	--							7	54	--	--	--	--
Short Vowel Sounds	3	23	1	8	--	--							3	23	3	23	--	--

[a] Only children remaining in the study through Post-test III were used in the sample

Table 27

Pretest and Posttest I Performance by Treatment Group On the Roswell-Chall Word Parts Test--Sounds

	Auditory-Reading (N=13)						Auditory-Only (N=10)						Reading-Only (N=13)					
	Knows All or Almost All		Knows At Least Half		Knows Less Than Half		Knows All or Almost All		Knows At Least Half		Knows Less Than Half		Knows All or Almost All		Knows At Least Half		Knows Less Than Half	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
A. Pretest																		
Consonant Sounds	2	15	7	54	4	31	2	20	4	40	4	40	2	15	9	70	2	15
Short Vowel Sounds	--	--	--	--	13	100	--	--	1	10	9	90	--	--	--	--	13	100
B. Posttest I																		
Consonant Sounds	11	85	2	15	--	--	7	70	3	30	--	--	9	69	3	23	1	8
Short Vowel Sounds	5	38	4	31	4	31	2	20	6	60	2	20	2	15	4	31	7	51

in the reading-only groups appeared to come into the study with a somewhat more complete knowledge of consonant sounds than did the auditory groups. There was no pre-test difference among the three groups in terms of knowledge of short vowel sounds; all groups had uniformly low scores.

The post-test I performance on the Roswell-Chall indicated that all treatment groups increased their knowledge of consonant and short vowel sounds. The auditory-reading groups seemed to have learned a higher proportion of the consonant sounds than did either the auditory-only or reading-only groups, whose performance was about on the same level. Both auditory treatment groups seemed to show a higher degree of learning of short vowel sounds than did the reading-only group, with the auditory-reading group doing a better job than the auditory-only group in the "knows all or almost all" category.

These rough comparisons would seem to support the tutors' feelings that in general the children were learning the specific skills being taught.

A comparison of the post-test Roswell-Chall test performance with tutor ratings of observed pupil progress (Table 26, Section A,) showed that the two auditory groups were judged to have mastered a higher proportion of consonant sounds than was indicated by post-test scores, thus supporting the tutors' feeling that the children had mastered more of these two skills than they were able to demonstrate on the tests. The post-test performance and tutor ratings for the reading-only groups were identical.

For short vowel sounds, the tutor ratings again indicated more progress than did the test scores, particularly in the auditory-only groups. There were only slight differences between ratings and test performance in the auditory-reading and reading-only groups.

The post-test performance and tutor ratings indicated that the children receiving either type of auditory treatment appeared to have a more complete knowledge of these two auditory skills at the end of the treatment period than did the reading-only group; the latter group began with an advantage in knowledge of consonant sounds but appeared to make less progress in learning either consonant or short vowels.

Sections B and C of Table 26 deal with tutor judgments of the children's ability to apply to reading the auditory skills they had learned. Such information was not available for the auditory-only groups since there was no opportunity to observe those children in an instructional reading situation.

It can be seen that although most of the children who had learned consonant sounds were judged capable of applying these skills to reading when encouraged to do so (Section B), only about two-thirds of them were observed to apply skills independently (Section C). This was true both for the auditory-reading and reading-only treatment groups. Differences in degree of application were more marked when dealing with short vowel sounds than with consonant sounds. One possible explanation is that short vowel sounds were almost entirely new to the children and therefore afforded more opportunity for learning, while knowledge of consonant sounds and their application were partially known to them.

It would appear that the ability to apply particular auditory skills to reading either with help or independently, may have some relationship to the degree of mastery of the skill. For all treatment groups children who were judged to have mastered less than half of the skills seemed unable to apply what they had learned to reading. The most successful application was seen in those who knew all or almost all of the sounds.

Although the reading-only groups showed a less complete knowledge of the two auditory skills at the end of treatment than did the auditory groups, they were judged to do a better job of applying these skills to reading. This was particularly true when judged on the short vowel sounds. All of the reading-only children who knew "all or almost all" of the short vowel sounds were able to apply their knowledge independently to reading; more than three-fourths of those who knew "at least half" of the sounds were observed to apply the skills they had to reading. By comparison, although all of the auditory-reading children who know "all or almost all" of the short vowel sounds were judged capable of applying the skills to reading, only half of them were observed to do so independently. In the "knows at least half" category, only one-half of those who knew the skills were judged capable of applying them to reading, and only one-fourth of them did so independently.

Thus,it would appear that although the reading-only children seemed to have less complete mastery of the two auditory skills under consideration, they seemed to be more successful in applying what they knew to reading. This may possibly have been due to two factors, working either independently or in combination. First, these two auditory skills were taught in the reading-only sessions only as needed, which may account for both the less complete mastery and the higher degree of application. Perhaps the fact that these skills were taught at the point where a need for them in the reading situation arose made their application to reading more obvious and meaningful to the children.

This would seem to support the possibility discussed earlier in the chapter that a remedial auditory program might have been more effective than a developmental one.

The second factor possibly at work in favor of the reading-only group was the opportunity for immediate and repeated practice in applying these two auditory skills to reading. This would again suggest the hypothesis that a correlated auditory-reading training program in which the children not only learned the skills but were given instruction in and repeated opportunity to apply them to reading might result in more substantial reading gains. This hypothesis was tested in Study II, reported in Chapters VII - IX.

C. Evaluation of Pupil Characteristics

One possible factor contributing to the lack of clear-cut post-treatment differences among the several treatment groups may have been pupil characteristics. In assigning the children to the groups, it was not possible to take into account certain pupil characteristics which later were judged to influence skill learning and transfer of those skills to reading. The selection criteria did not always isolate these characteristics. They became apparent only after the sessions were underway.

The tutors felt that the following difficulties existed:

1. Language Development - One hindrance seemed to be the children's generally low level of language development. Their limited speaking vocabulary made it necessary for the tutors to choose carefully the words, sentences, and stories needed to teach the skills in the auditory curriculum. This appeared to be true for both ethnic groups, although in some cases the Spanish-speaking child was observed to have the Spanish equivalent of a particular label or concept he did not know in English.

A second hindrance was the substantial degree of speech distortion present. These distortions were not speech defects, but were rather mispronunciations of common words-- "teef" for "teeth", "dis" for "this", "tangerine" for "tambourine", etc. Medial vowel confusions and dropped word endings were also noted. This appeared to lead to difficulty in correctly relating sounds to spoken words, and conceivably contributed to confusion when the printed word was introduced. In addition, the Puerto Rican children had the added handicap of a Spanish accent, although every attempt had been made to include in the study only children who were considered by their school to speak English fluently. Interestingly, the data analysis indicated that the bi-lingual children who received auditory training showed significant post-treatment gains in reading. Perhaps their English language difficulties were more related to learning a a second language, rather than to learning another more precise dialect of the same language, as would be the case for the Negro children. Thus, auditory training in the sounds of the new language for the Puerto Rican children might have facilitated the use of those new sounds in learning reading skills.

A third handicap appeared to be the children's lack of many of the concepts which were judged necessary for mastery of the auditory curriculum. It was necessary, for example, to teach the concepts of "beginning," "middle," and "end" - or "first," "middle" and "last"- so that letter sounds could be identified in various positions in words, In some cases time had to be spent clarifying the concepts of "same" and "different". The children also had to be given practice in verbalizing concepts which they understood but seldom or never before put into words. All of these activities consumed more time than was anticipated in the original plans for the curriculum.

2. Reading Skills Development - The children in the sample were selected on the basis of reading test results and the criteria described in Chapter II of the report. The groups were formed by combining those children who, on the basis of test performance, seemed to be reading at approximately the same level and to have similar reading skill needs. At the start of the program these screening devices appeared to be adequate to insure homogeneous groups for reading instruction. (As stated previously, performance on auditory tests was not taken into account in grouping the children for treatment.) Once the work with the children was begun, however, it was discovered that although pre-test performance was similar for a group, there were wide ranges in ability and skill level within many of the groups in both the reading and auditory programs.

In several instances the screening tests failed to single out the children who appeared to have reading disabilities that would have best been handled in an individual situation rather than through the group training used in the study. The inability of some children to profit from the curriculum and inability of the staff to adequately meet their particular needs undoubtedly contributed to their lack of progress. Such children were identified by the tutors only after considerable work in the group situation. Identification of them in the selection phase of the study would have been impossible without long and elaborate diagnostic procedures.

3. Pupil Behavior - It was felt by the tutors that effective teaching and learning of auditory and reading skills in the study might have been handicapped to a substantial degree by certain behavior characteristics of the children. Therefore, a set of rating scales and a personality checklist were constructed to describe these characteristics. (See Appendix P for the form used). At the end of the 50 treatment sessions, the tutors rated each child on characteristics which were grouped under the major categories of task orientation, work habits, group interactions, and personality characteristics. Table 28 below summarizes these tutor ratings by treatment group. The children in the control group were of course not rated, since the tutors had no contact with them other than when testing them.

Table 28

Post-treatment Tutor Ratings of Behavior and Personality Characteristics of Individual Children by Total Sample and by Treatment Group

(N=43)[a.]

			Treatment Group					
	Total Sample N=43		Auditory-Reading N=15		Auditory-only N=13		Reading-only N=15	
TASK ORIENTATION	f	%	f	%	f	%	f	%
A. General Attitude								
Eager or interested	27	63	10	67	7	54	10	67
Indifferent	15	35	5	33	5	38	5	33
Reluctant or resitant	1	2	-	-	1	8	-	-
B. Reaction to Tasks								
Self-motivated	6	14	4	27	1	8	1	7
Capable of motivation	17	40	5	33	6	46	6	40
Selectively responsive	14	32	5	33	5	38	4	27
Infrequently or non-responsive	6	14	1	7	1	8	4	27
WORK HABITS								
C. Concentration on Task								
Almost always or usually	20	46	6	40	7	54	7	47
Sometimes	16	37	8	53	4	30	4	27
Seldom or never	7	17	1	7	2	15	4	27
D. Works Independently								
Almost always or usually	18	42	4	27	7	54	7	47
Sometimes	14	32	8	53	4	30	2	13
Seldom or never	11	26	3	20	2	15	6	40
GROUP INTERACTION								
E. Orientation to group work								
Always or generally co-operative	26	61	9	60	7	54	10	67
Erratic	13	30	6	40	5	38	2	13
Generally or almost always disruptive	4	9	-	-	1	8	3	20

Table 28
(Continued)

			Treatment Group					
	Total Sample N=43		Auditory-Reading N=15		Auditory-only N=13		Reading-only N=15	
	f	%	f	%	f	%	f	%
F. Competes with Other Group Members								
Almost always or usually	17	40	5	33	9	69	3	20
Sometimes	18	42	8	53	2	15	8	53
Seldom or never	8	18	2	13	2	15	4	27
G. Responds to Distracting Behavior								
Seldom or never	7	16	-	-	4	30	3	20
Sometimes	11	26	5	33	1	8	5	33
Usually or almost always	25	58	10	67	8	62	7	47
PERSONALITY CHECKLIST								
Self-confident	13	30	4	27	5	38	4	27
Cooperative (individual situation)	35	81	12	80	10	76	13	87
Compliant	15	35	7	47	3	23	5	33
Withdrawn	2	5	-	-	-	-	2	13
Seeks nurturance	8	18	3	20	2	15	3	20
Fearful	2	5	1	7	-	-	-	-
Domineering	4	9	1	7	2	15	1	7
Resents distraction	5	12	-	-	3	23	2	13
Low frustration level	11	25	4	27	4	30	3	20
Attention seeker	13	30	6	40	5	38	2	13
Verbally hostile	10	23	5	33	4	30	1	7
Physically aggressive	11	25	5	33	4	30	2	13
Negative	5	12	1	7	1	8	3	20

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a. Ratings were made for all children who remained in the study through the treatment sessions.

The results of the ratings are discussed for the total treatment sample since there did not appear to be major differences in ratings among the three treatment groups.

a. Task Orientation

The four tutors were in agreement that if it were necessary to pinpoint one reason for the absence of widespread learning, that reason would be lack of motivation.. Again there were individual differences among the children, but generally there seemed to be little interest in and enthusiasm for either the reading or auditory curriculum as such. A majority of the children (63%) were judged to be either "eager" or "interested" in terms of their general attitude toward the project. (Item A) However, this attitude embraced not only the specific learning tasks but the concept of special, small-group attention in a friendly, relatively permissive atmosphere. It is felt that the children were reacting substantially, if not primarily, to the general atmosphere of the sessions rather than to the curriculum per se.

Fourteen percent of the children were judged to be self-motiviated; 40% were judged capable of being motivated through encouragement; 46% showed selective or infrequent interest in the tasks. (Item B)

It appeared to the tutors that the children were not oriented toward a general learning goal. They seemed to be more concerned with immediate rewards and satisfactions, such as winning games or being "first" or better than the others, than with a desire to become better readers. Of course there were individual differences in this respect, and wide ones, but in general, learning goals appeared to be low. The immediate rewards seemed to be the important ones to the children. Reading did not seem to be a meaningful part of their lives, a factor which was undoubtedly reflected in their general inability to apply the auditory skills to the extent hoped for in the study. The need to learn did not seem to be present, and the tutors were able to instill this need in only a small proportion of the children.

b. Work Habits

A number of the children seemed to show poor work habits in addition to immature group behavior. A short attention span was a common characteristic. This, combined with high distractibility, resulted in difficulty in concentrating on an assigned task. Slightly less than one-half (46%) of the children were judged to be capable of "usually" or "almost always" concentrating on a task in group work. (Item C)

As indicated earlier, substantial differences in ability and skill level were found within groups thought to be homogeneous at the start. As the sessions progressed, those differences became more apparent in both the reading and the auditory groups. An effort was made to compensate for these discrepancies by assigning individual work, but this was hampered by the general inability of the children to work independently. (Item D) Only 42% of the children seemed able to work independently most of the time; 32% could do so at times, while 26% were seldom or never able to do independent work. In practice, if one child in a group was unable to work independently, this was usually sufficient to frustrate the tutor's attempts to organize even a small portion of the session on an individual basis. Those children who could work successfully on their own seemed to resent the fact that a disproportionate share of the tutor's attention went to the dependent child.

One item on the Personality Checklist -- "self-confident" -- could conceivably be interpreted as affecting the area of independent work. Only 30% of the children were judged to be willing to try a task when they were not sure of success. The other children needed to be urged and supported by the tutor. In addition, 25% of the children were seen as having a low frustration level. It is likely that these children would have difficulty working independently.

c. Group Interaction

Items E, F, and G of the ratings deal with group interaction. In spite of the fact that the groups were composed of no more than four children, the tutors reported difficulties in maintaining a cohesive, working group relationship.

One of the problems encountered in maintaining the group was the high level of distractibility among the children. Item G of the ratings indicates that 58% of the children usually or almost always were set off by distracting behavior. An additional 26% "sometimes" responded to distraction. When this fact is coupled with the figures from Item E, which indicate that 39% of the children were erratically or generally disruptive, a picture begins to emerge of the difficulties that experienced, competent tutors had in maintaining an atmosphere conducive to effective teaching and learning.

Group cohesiveness was further impaired by highly competitive behavior; 40% of the children usually or almost always were concerned with the "fairness" of the treatment received from the tutor and the other children; an additional 42% exhibited this concern part of the time. (Item F) Only occasionally was it possible to channel this competitive spirit into constructive learning. Usually it manifested itself as destructive, distracting behavior.

The tutors reported that such competitive behavior appeared to be more predominant in mixed sex groups.

It is interesting to compare the above figures with items on the Personality Checklist also on Table 28. Eighty-one percent of the children were judged to be cooperative in a one-to-one situation with the tutor. The tutors agreed that learning took place at a much more rapid rate on those occasions when absences reduced the group to one (cooperative) child. In addition, 18% of the children were described as seeking nurturance from the tutor; 30% were described as attention seekers; 24% and 25% were, respectively, described as verbally and physically aggressive. These items taken together seem to indicate that the staff was dealing with a group of children who for the most part were not able to work effectively in a group learning situation.

Early in the course of the study it was found that despite the selection procedures three children with severe behavior problems had been assigned to treatment groups. These children completely disrupted the groups and for this reason were eliminated from the study in its early stages. They are not included in the ratings. Some of the children who remained in the study were judged by the tutors to exhibit emotional difficulties serious enough to hamper their learning and to warrant special attention.

The difficulties resulting from the pupil learning characteristics reported above appeared to be more pronounced among the 60% of the children who received their instruction at the Institute rather than in their schools. It was felt that the interruption in the school routine and the excitement of travelling to the Institute afforded considerable distraction which was not present when instruction was given on school premises. Since two of the tutors taught only in the schools and the other two only at the Institute's Reading Center, it seemed appropriate to look at the characteristics of the pupils assigned to each tutor. Table 29 summarizes these ratings by tutor. The data on Table 29 are the same data presented on Table 28, but are grouped differently.

In general, it appears that the tutors who taught at the Institute (Tutors 1 and 2) were dealing with a higher proportion of children with ratings at the low end of the scales than were the tutors who taught on school premises (Tutors 3 and 4). This conclusion, of course, assumes that the tutors used the same reference points in their ratings. If so, this would seem to underscore the desirability of avoiding disruption for the children of their school day. Possibly a break in the school routine magnified those pupil characteristics judged to

Table 29

Post-treatment Tutor Ratings of Behavior and Personality Characteristics of Individual Children, by Total Sample and by Tutor Group (N=43)[a].

	Total Sample N=43		Taught at Institute				Taught at Schools			
			Tutor 1 N=13		Tutor 2 N=11		Tutor 3 N=9		Tutor 4 N=10	
TASK ORIENTATION	f	%	f	%	f	%	f	%	f	%
A. General Attitude										
Eager or interested	27	63	5	39	7	64	8	89	7	70
Indifferent	11	35	3	22	4	36	1	11	3	30
Reluctant or resistant	5	2	5	39	-	-	-	-	-	-
B. Reaction to Tasks										
Self-motivated	6	14	1	8	-	-	3	33	2	20
Capable of motivation	17	40	5	38	2	18	3	33	7	70
Selectively responsive	14	32	5	38	5	45	3	33	1	10
Infrequently or nonresponsive	6	14	2	16	4	27	-	-	-	-
WORK HABITS										
C. Concentration on Task										
Almost always or usually	20	46	5	38	1	9	6	67	8	80
Sometimes	16	37	5	38	6	55	3	33	2	20
Seldom or never	7	17	3	23	4	36	-	-	-	-
D. Works Independently										
Almost always or usually	18	42	5	38	1	9	6	67	6	60
Sometimes	14	32	4	30	3	27	3	33	4	40
Seldom or never	11	26	4	39	7	53	-	-	-	-
GROUP INTERACTION										
E. Orientation to group work										
Always or generally cooperative	26	61	10	76	3	27	7	79	6	60

Table 29
(Continued)

			Taught at Institute				Taught at Schools			
	Total Sample N=43		Tutor 1 N=13		Tutor 2 N=11		Tutor 3 N=9		Tutor 4 N=10	
E. Orientation to group work (continued)	f	%	f	%	f	%	f	%	f	%
Erratic	13	30	2	16	5	45	2	22	4	40
Generally or almost always disruptive	4	9	1	8	3	27	-	-	-	-
F. Competes with Other Group Members										
Almost always or usually	17	40	2	16	4	36	6	66	5	50
Sometimes	18	42	6	45	6	55	1	11	5	50
Seldom or never	8	18	5	38	1	9	2	22	-	-
G. Responds to Distracting Behavior										
Seldom or never	7	16	2	16	1	9	4	44	-	-
Sometimes	11	26	4	30	1	9	2	22	4	40
Usually or almost always	25	58	7	54	9	82	3	33	6	60
PERSONALITY CHECKLIST										
Self-confident	13	30	4	30	2	18	3	33	5	50
Cooperative (individual situation)	35	81	8	60	10	75	8	89	9	90
Compliant	15	35	9	68	2	18	3	33	1	10
Withdrawn	2	5	1	8	1	9	-	-	-	-
Seeks nurturance	8	18	3	23	4	36	1	11	-	-
Fearful	2	5	1	8	1	9	-	-	-	-
Domineering	4	9	1	8	2	18	1	11	-	-
Resents distraction	5	12	2	16	1	9	2	22	-	-
Low frustration level	11	25	3	23	4	36	2	22	1	10
Attention seeker	13	30	3	23	3	27	2	22	5	50
Verbally hostile	10	23	1	8	4	36	2	22	1	10
Physically aggresive	11	25	2	1[illegible]	5	45	2	22	-	-
Negative	5	12	1	8	6	55	1	11	-	-

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a. Ratings were made for all children who remained in the study through the treatment sessions.

be detrimental to effective learning. In Study II, reported in Chapter VII - IX, all teaching was done in the schools to avoid that problem.

To see whether there was any relationship between tutors' ratings of learning characteristics and the children's actual reading achievement, a comparison was made between some of the ratings from the Behavior Rating Scales and scores from the Gates Primary Paragraphs and the Gates Oral Reading Test. Five ratings were used, as listed on Table 30 below. Two groups of children were used; high scorers who had received a rating of 1 or 2 on a characteristic, and low scorers who had received a rating of 4 or 5 on the same characteristic. The mean reading scores earned on the two reading tests on post-test I were found for the high-scorer and the low-scorer groups.

Table 30

Comparison of Mean Reading Scores of High-and Low-Scorers Grouped on Five Learning Characteristics.

	Gates PPR Grade Score				Gates Oral Reading Test Grade Score			
Learning Characteristics	High Scorer	N	Low Scorer	N	High Scorer	N	Low Scorer	N
B. Reaction Specific Tasks (Motivation)	2.92	23	2.57	7	3.28	23	3.10	7
C. Concentrates on Task	3.01	19	2.50	7	3.46	19	3,03	7
D. Works Independently	3.14	17	2.55	11	3.56	17	2.96	11
E. Orientation to Group Work (Cooperative-Disruptive)	2.96	24	2.40	4	3.42	24	2.93	4
G. Response to Distracting Behavior	2.97	7	2.64	25	3.29	7	3.02	25

Since tests of significance were not done, interpretation of the data is only suggestive. As can be seen from Table 30, for all of the learning characteristics, on both reading tests, the high-scorers earned a higher mean reading grade score. For characteristics C,D,and E the differences were at least .4 of a reading grade. For G and for B, especially for the Gates Oral Reading Test score, differences were slight between high-and low-scorers. Thus, there is some suggestion from Table 30 that some learning characteristics seem to be positively related to reading achievement scores.

D. Evaluation of Attitudes Toward Treatment Groups

After the instruction sessions, the tutors filled out a teacher attitude scale found in Appendix Q. The scale was designed to tap the tutors' preferences among the various treatment groups with respect to the techniques and materials used as well as with respect to the children's personalities. The tutors' ratings for the questions are found in Table 31.

As can be seen, the four tutors' attitudes toward the groups seemed to be similar. The auditory-play group was given the lowest or it tied for the lowest rating on all six questions. Since this was the only non-reading treatment group, it was not surprising with respect to the materials used that the reading tutors would least enjoy teaching it. However, this group was always rated lowest in terms of the children's personalities, too. It may have been that the children in the auditory groups of all the tutors were less personable or that either the materials used or the tutors' attitude toward these materials produced disinterested and restless children who were therefore less personable to the tutors. The relationship between tutor ratings on questions 1 and 2 (concerned with the materials used and the children's personalities) was also high for the reading-play and reading-auditory treatments. Only one tutor, tutor 1, reversed the ratings for these two groups in questions 1 and 2. Other than tutor 1, if the reading-play group were rated 1 by a tutor in question 1, it was likely to be rated 1 in question 2 by that tutor. Thus, there seemed to be some correlation between the tutors' attitude toward the materials taught in a particular treatment group and their attitude toward the personalities of the children in the treatment group. The conclusion does not hold for two groups when looking at question 5 where the personalities of the children in the groups were rated independently of the other treatment groups. The reading-only and reading-auditory treatments received the same ratings. The auditory-only group was rated lowest in question 5 by two of the four tutors, those two who taught at the Institute. Perhaps, the effect of the disruption of the school day, as mentioned earlier, was enhanced by the effect of the subject matter taught and produced even more difficult children.

As Table 31 also shows, there was possible evidence for a relationship between the tutors' attitude toward a particular treatment and the direction of the tutor by treatment interaction from the analysis of covariance results. Tutor 1 usually showed a positive relationship between her attitude toward a group and the direction of the interaction with that particular group.

Tutor 2 had too few significant interactions to explore this data.

Table 31

Tutor Ratings on Teacher Attitude Scale, with Comparison to Results from the Analyses of Covariance

	Tutor			
Question by Group	1	2	3	4
Question 1				
R-P[a]	1[b] +[c]	1+	2-	1+
R-A	2-	2-	1	2
A-P	3-	3	3+	3-
Question 2				
R-P	2+	1+	2-	1+
R-A	1-	2-	1	2
A-P	3-	3	3+	3-
Question 3				
R-P	1+	1+	2-	1+
R-A	2-	2-	1	2
A-P	3-	3	3+	3-
Question 4				
R-P	1+	1+	2-	1+
R-A	2-	2-	2	2
A-P	4-	4	3+	2-
Question 5				
R-P	2+	2+	2-	1+
R-A	2-	2-	2	1
A-P	4-	4	2+	1-
Question 6				
R-P	2+	1+	2-	1+
R-A	2-	2-	2	2
A-P	4-	4	3+	2-

a. R-P = Reading-Play
R-A = Reading-Auditory
A-P = Auditory-Play

b. 1 indicates the highest rating.

c. Sign indicates direction of interaction of that tutor with that treatment group from analysis of covariance results.

Tutor 3 showed a negative relationship between her liking of a group and that tutor by treatment interaction. The group she liked least did best with her tutoring (auditory-play) and vice-versa.

In Tutor 4's case the more favorable attitude toward a particular treatment group coincided with a positive tutor by treatment interaction for that group. In questions 4-6, however, tutor 4 rated all her groups as nearly equal so that there was not much distance between her 1 and 3 ratings seen in questions 1-3.

Thus, there was some indication that the tutors' attitudes toward the subject matter taught and the children's personalities was related to the performance of the children. However, the relationship was not always positive, since a more favorable attitude by the tutor toward the group did not always lead to better group performance.

E. Summary

Evaluations by the staff of various aspects of the auditory program as well as the children's characteristics gave further indications about the effectiveness of the study. It was felt by the tutors that the developmental auditory program probably should have been a remedial auditory program, because of the wide individual difference among the children as well as the need for more flexibility in presenting the skills. In addition, the auditory program was seen to need more coordination with reading skills, since the children were unable to transfer the skills to reading on their own. It was felt that the time spent on the auditory program was adequate, but perhaps the same time might have been better spent if there had been more coordination of auditory skills with reading skills.

In evaluating pupil progress on two areas of skill learning, consonant sounds and short vowel sounds, the tutors judged that all treatment groups increased their skill knowledge. The auditory groups seemed to have learned more skills than the reading-only group. In a comparison of reading test results with tutor judgments, the skill knowledge did not result in increased test scores. In application of the two areas of skills to the reading situation, fewer children could or did apply the skills. Although the auditory groups seemed to know more skills the reading-only group seemed better able to apply what skills they knew to reading. The better application was seen as a possible function of practice in application as well as the group learning the skills needed at the moment to aid them in reading.

Evaluations of pupil learning characteristics showed that there were some areas of weakness possibly influencing the reading and auditory learning. First, there were deficiencies in language development, such as limited speaking vocabulary, distortions of words, and lack of common concepts. Secondly, there seemed to be a lack of task orientation which resulted in poor motivation for learning. In addition, the children seemed to have poor work habits which made it difficult for them to work independently. They also had trouble working together because of distracting behavior among themselves. It was felt that for those children who came to the Institute for lessons, the distractions of an interrupted school day resulted in poor orientation to learning.

The influence of pupil learning characteristics on reading achievement was supported by a comparison of the reading scores of the high and low scorers on five of the learning characteristics. In all cases the high scorers had a higher mean reading achivement score, with seven of the ten scores being higher by at least four months. Since no tests of significance were done, the differences were suggestive only of the positive relationship between learning characteristics and reading achievement.

Tutor ratings for preference of treatment groups relative to the methods and materials as well as to the children's personalities were also obtained. There seemed to be some positive relationship between ratings of methods and materials and ratings of children's personalities. However, that relationship did not always lead to better group performance, when the tutor ratings were compared to the analysis of covariance results.

VI

Discussion

The results presented in Chapters IV and V show little evidence to support the hypothesis for the study, that a developmental auditory skills program will facilitate remedial retraining for socially disadvantaged retarded readers of the ages included in the study. In the design used, neither the auditory nor the reading treatments nor the succesive presentation of the two treatments were shown to be related to increased reading achievement, although some interaction effects were shown among tutor, time, ethnic group, and treatment variables. Further, reading scores obtained after treatment from the combined experimental groups were not significantly higher than those for the control group. The three experimental groups showed significant improvement on three of the reading tests when their performance on post-test III was compared with that for post-test I or II. When the control group was included in these comparisons, the differences were not significant, suggesting that the control group did not show similar improvement.

The preponderance of negative findings raises some questions about the study.

A. Adequacy of Reading Tests

Did the tests measure what was taught or learned in the curriculum? The reading tests used were standardized tests, measuring in the usual way connected reading skills as well as reading subskills. No differences between treatment group scores were shown on these tests from pre-test to post-test periods. However, three of the reading tests showed improvement, when the experimental groups were combined, from post-test I to post-test III. Also, item analyses of several of the reading tests showed some changes in error patterns after treatment, with decrease in "easy" errors and continuation of "harder" errors. Thus, there were indications of some score increase in reading. It could then be asked whether the gain was sufficient to indicate actual reading improvement. It could also be questioned whether other reading improvement was made which was not measured by the present tests. Unfortunately the study does not provide evidence to answer these questions.

B. Adequacy of Auditory Tests

In evaluating the auditory tests to determine if they were adequate measures of what was taught or learned in the curriculum two problems were found. First, the content of the auditory curriculum was seen to be dissimilar to the skills measured on the auditory tests. The auditory curriculum had been constructed to stress skills considered closely related to reading skills, while the tests were constructed to measure more general auditory skills. They were therefore not a direct measure of those skills in the auditory curriculum. Since it had been expected that learning specific auditory skills would have generalized to learning more general skills, the tests were considered appropriate measures at the time of their construction. Apparently that generalization did not occur and therefore the dissimilarity between test items and the auditory curriculum was one factor in the failure of the children to show gain on the auditory tests.

The second problem area was the tests themselves. Most of the auditory tests had been constructed for the study. Although they generally had adequate reliability, other defects were noted in them. Several of the tests had low ceilings, which precluded opportunity for gain in scores by the children. The correlation analysis and the factor analysis clearly showed that the four auditory areas around which the tests were constructed, i.e., recognition, discrimination, attention, and memory, were not separate areas. In the factor analysis, one grouping was found which included several of the areas, while other tests, presumed to be measuring similar skills, did not relate to each other. The auditory tests seemed to measure other skills than those for which they were constructed; adequate measures of the four areas taught in the auditory curriculum were not obtained.

Thus the auditory tests were less adequate measures of the skills they were constructed to measure. In addition, the dissimilarity between the auditory curriculum and the auditory tests was another factor in the failure of the children to increase auditory scores after treatment. It should be pointed out, however, that no other appropriate auditory tests existed; it was necessary to construct them for the study.

C. Were the skills taught in the curriculum learned ?

Another question raised concerning the results of the study was whether there was any evidence (given the tests as already discussed) that the skills included in the reading and auditory curriculum were learned by the children.

In the reading program there was little quantitative evidence of gain. As already discussed, no significant gains were seen for any of the treatment groups from the pre-test to the post-test I, while from post-test I to post-test II and from post-test II to post-test III there were gains on three of the reading scores. This was true for the three experimental groups; when the control group was included, no improvement was shown. Other evidence for improvement for the experimental groups was shown on the tutor rating scales. The tutors felt that there had been some increase in reading skills. Apparently, that improvement was not reflected in the test scores, suggesting that the improvement was minimal or not solid enough to be seen on more general reading tests.

A similar conclusion, that learning not measured by the tests took place, was reached concerning the auditory curriculum. Comparison of the auditory scores at different testing periods showed few significant differences from pre-test to post-test I scores and no significant differences from one post-test period to another, indicating few gains that might be interpreted as skill learning. From the supplementary analyses of two skills, consonant sounds and short vowel sounds (see Chapter V), all children were judged by the tutors to have learned some of the skills. However, fewer of the children seemed able to apply their knowledge to reading with help and even fewer were able to apply the skills independently. Apparently the two auditory skills had been learned in varying degrees, but skill levels were not at a point that increase in skill learning could be shown in the test situation. Thus, although there is some evidence that some of the auditory skills had been learned, the gains were apparently not solid enough to be reflected in test scores.

In summary, the qualitative analyses of the reading and auditory curricula showed that some of the skills in each area had probably been learned but that the gains were not reflected on the tests. However, whether those gains were substantial enough to be useful in school learning cannot be answered.

D. Appropriateneness of the Auditory Curriculum

Since few quantitative gains were made either in the reading or auditory skills, a third question was asked concerning the appropriateness of the auditory curriculum. Did the learning of the auditory skills, to whatever extent they were learned, increase learning of the reading skills? The primary data analyses gave no evidence that this was so. Even though the auditory curriculum was constructed to teach skills related to reading skills, the curriculum appeared not to influence the learning of the reading skills.

The tutors' evaluation of the auditory program itself gives some explanation for its apparent lack of influence. They felt that the combination of a developmental auditory program and a remedial reading program was unworkable. The wide range of auditory skills among the children as well as the need for more flexibility in teaching auditory skills needed at a particular time in reading suggested that auditory skills should be taught without regard for developmental sequence. More coordination between the two programs was seen to be needed, with emphasis on teaching the transfer and use of auditory skills in the reading situation.

Interestingly, the children in the reading-only group were judged by the tutors to have made the best independent use of auditory skills in the reading situation, even though they did not have as many auditory skills as those children who had been given auditory training. The crucial factor was seen to be the practice in application of auditory skills to reading learning which the reading-only group had been given. Apparently the learning of auditory skills was not enough; practice in the transfer and application of skills to the reading situation is evidently an equally important step.

Some questions were also raised about the value of a developmental program with third-grade children, since perhaps it was too late to teach them auditory skills in a developmental sequence. A remedial presentation of auditory skills might have made the reading learning easier for the child and thus given him stronger motivation for learning the auditory skills.

Thus it was concluded that the method of presentation of the auditory skills used in the study did not facilitate their use in reading learning. Instead a remedial approach, combining reading and auditory curriculum, was felt to be a better approach.

In summary, concerning the questions raised about the results of the study, there is doubt as to whether the hypothesis of the study was tested adequately since: 1. the auditory tests did not measure well the auditory skills presented in the curriculum; and 2. there was little direct evidence that many of the reading or auditory skills were learned by the children. In any case the hypothesis had little support in the study, since no evidence was shown that the auditory program had positive effects on reading achievement.

However, other evidence from the analyses is relevant to the results of the study. Apparently two other groups of variables, neither sufficiently delineated in the study, were factors in learning: teacher characteristics and pupil characteristics.

Results from the analysis of covariance showed that tutor by treatment interaction effects were related to the reading achievement scores. There could be many possible explanations for these interactions, such as methods of teaching, teacher attitude, or interactions of teaching personality with pupil personality. No one explanation can be offered on the basis of the present data. Since within a particular tutor group there was a mixture of Negro and Puerto-Rican children, that effect may also account for some of the teacher variables affecting reading.

Two kinds of pupil characteristics were noted and evaluated in the study. The first, ethnic group, when related to treatment group was shown to have an effect on reading achievement. Negro children seemed to profit most from the reading-only treatment group in regard to reading achievement scores, while Puerto-Rican children seemed to benefit most from the auditory-only training in regard to their reading achievement scores. Again, although many explanations could be offered, the most plausible one seems to be a language difference explanation, i.e., the Puerto-Rican child was learning English as a second language and therefore benefited in his reading from additional auditory training, while the same auditory training may have confused the Negro child in reading since the sounds he learned were similar but still different from those in his own dialect.

The second set of pupil characteristics that seemed related to reading achievement was the learning characteristics of the children. Ratings of these by the tutors for each child showed that many children had characteristics that seemed to hamper learning, such as lack of task orientation, poor work habits, inability to work independently, and difficulty in working in groups. A comparison of groups scoring high or low according to their ratings on these learning characteristics showed that the high scorers always did better than the low scorers on the two connected reading tests, in most cases with a four months' advantage in reading level. Since no tests of significance were used, the results can only be suggestive of the positive relationship between learning characteristics and reading achievement. Thus, some evidence is suggested that both teacher and pupil characteristics may have been important variables in affecting the results of the study.

In conclusion, no one of the four treatment groups in the study did better than any of the other groups on the reading or auditory tests. Several questions were raised as to why the hypothesis, that auditory training will facilitate reading, was not upheld. These questions concerned the ability of the auditory and reading tests to measure any skill gains, whether the auditory and reading skills presented were learned by the children, and whether the auditory program was appropriate and useful for the relearning of reading skills. Also some evidence was shown for the influence of two variables on reading learning, teacher characteristics and pupil characteristics.

Negative results are always the most difficult to analyze, inasmuch as the null hypothesis can neither logically nor methodologically be really verified. Negative results in a study with as many individual groups and interactive variables as the present one are even more difficult to clarify, because even if it were possible to control the known variables, there are undoubtedly variables operating which have not been defined nor perhaps even discovered. Therefore, the results of the study as a whole must remain partially unexplained at this point.

The discussion above contains indications of appropriate directions for further research to delineate the relevant variables and perhaps to answer at least some of the questions raised. There is also, however, a theoretical basis on which the outcome of the studies might be understood. That has to do with questions of the influence of timing of stimulation on its effects. For example, the theories of optimal and critical timing involve the concept that stimulation applied at one time in the life of the individual will have different effects on his development from the effects of the same stimulation applied at a different time. Most often, these concepts in biology and in behavioral science are adduced to explain the greater or more desirable effect of an earlier application of the stimulation in question, as opposed to a later application.

It can also be postulated that a particular skill learned earlier will be more likely to generalize to other skills than will one learned later, that is, there are basic skills which underlie numerous specific skills, and presumably given basic skills may underlie many specific skills. It may be that when a basic skill is acquired relatively late in the individual's development, its relationship to the specific skills which rest on it is changed. Perhaps if the basic skill is acquired early, the generalization to the overlying specific skills is relatively automatic, in the sense of needing experience on the part of the individual, and no instruction may be needed in the application of the basic to the specific. But perhaps if the skill is acquired relatively late, the generalization does not take place, or takes place more slowly, or may take place only with specific instruction.

In the light of these propositions, it may be that the results obtained in the present study reflect the fact that children of the age of the present sample are past the optimal age for having a basic skill, such as auditory discrimination, generalize automatically or effectively to reading skill. It may well be that auditory discrimination training of children before they have reading training would generalize to the reading skills when they were taught. Or it may be that to do an effective job of training both reading and auditory discrimination in children of the age of the subjects in these studies requires a conscious and concerted effort to teach the generalization of one skill to the other. Some evidence for the plausibility of this latter approach is to be found in the tutors' reports of their experiences in the second study.

This view of the present work and its results suggests the formulation of a series of further studies, which might attempt to teach auditory skills to children lacking them before an attempt is made to teach them to read, or which might experiment with different approaches to teaching generalization of the basic skills to reading as well as the skills themselves.

The problem remains that children retarded in reading have poor auditory skills, and that both these skill areas must be acquired for successful school performance. Therefore, it is hoped that the results of the present study can be used to determine the direction of future work on these problems.

VII

Introduction and Procedure

Study II

A. Introduction

Study II was undertaken during the second year of Study I, at the conclusion of its treatment period. Supported by additional funds from the U.S. Office of Education, Study II had a threefold purpose:

1. to undertake further analyses of the auditory test battery,
2. to further systematize and refine the auditory curriculum, and
3. to repeat the experimental treatment groups with some modifications based on experience from Study I.

The first aim has already been discussed in Chapter IV. The second aim is discussed in Chapters V and VIII. The present chapter is concerned with the third aim--that of repeating the experiment with the modified treatment. Although data collection was not yet complete for Study I when Study II was begun, there was strong feeling on the part of the staff that certain modifications in the original design might bring increased reading achievement among the children. The tutors felt that more opportunity was needed for directed application of auditory skills to reading than had been provided for in the treatment groups used in the first study.

Study II was designed to provide for a new treatment group, one which combined auditory and reading training in the same session, rather than presenting them successively. The auditory - only treatment group was eliminated because, in absence of quantitative data at the time of the decision, it seemed to be the least effective treatment method.

The design and results of Study II are presented briefly in the following chapters, since many of the procedures used were identical to those used in Study I.

B. Design

A design similar to that in the original study was used in the supplementary study, with some changes in the content of the curriculum for one of the treatment groups. Three kinds of treatment were used in this study -- reading-only, reading-auditory and combined reading and auditory treatment -- plus a control group. The content of the reading-auditory and reading-only treatment groups remained unchanged from Study I. However, instead of an auditory-only training group, a new program combining auditory and reading instruction was introduced. Rather than presenting instruction successively in those two skills, the new program interleaved them so as to provide more opportunities for guided transfer of learned skills.

Again, each of the treatment groups spent an equal amount of time with the tutor, 60 minutes per session. However, since no play periods were included, each session was devoted only to instruction, for a total of 120 minutes of instruction per week for all children. By comparison, in Study I, the auditory-only and reading-only groups received 105 minutes per week of actual instruction, while the auditory-reading group received 210 minutes per week of instruction. Thus, the reading-only group received double the amount of reading instruction as did the other two groups in which reading and auditory instruction were presented. As before, a control group was included in the study which spent no time with the tutors.

Each of the four tutors taught at least two different treatment groups. All instruction was given in the morning, except for one group which had its lesson from 1:00 to 2:00 p.m.

The same batteries of reading and auditory tests given in the original study (Study I) were administered to the children before and after the treatment period. No six or twelve-month post-testing was done. Table 32 shows the design of the study.

C. Procedure

Sample Selection. Three of the five schools used in the original study participated in the supplementary study. Third-grade children recommended by classroom teachers and guidance counselors on the basis already outlined in Chapter II were screened with the Gates PPR test. Those children who scored at reading grade 2.4 or below were considered sufficiently retarded for the study and, therefore, were given the individual reading and auditory batteries. The 36 children resulting from the screening were included in the original sample. During the course of the year two children dropped out of the study.

Testing. The reading and auditory tests used for the original study and described in Chapter II, were administered twice to the children. The first administration, before treatment began, was given in January 1965. The second administration was after treatment, in May and June of 1965. The Lorge-Thorndike Intelligence test was given in March of 1965. The tests were administered in the same way as in Study I.

Table 32

Design of Study II

Time	Treatment Groups			
	Auditory-Reading Combined	Auditory-Reading	Reading-Only	Controls
December 1964	Pre-test	Pre-test	Pre-test	Pre-test
January-June 1965	Auditory-Reading Program Combined	Reading Program & Auditory Program	Reading Program	
June 1965	Post-test	Post-test	Post-test	Post-test

Treatment. Table 33 presents the distribution of the children for the study by the treatment and tutor groups. Because of the small number of treatment groups in Study II, it was not possible for each tutor to work with each kind of treatment group. The different types of treatment groups were randomly assigned to tutors. The treatment sessions were 60 minutes in length. The groups met twice weekly, for a total of two hours per week of treatment, or 30 hours of treatment time overall. Sessions began on January 18, 1965 and were ended in May. All treatment was done in the schools.

D. Description of the Curriculum

Reading. The Study II reading program was organized along the same lines as in the original study and so will not be described again. Chapter III gives detailed description of the reading curriculum.

Auditory. In Study II the auditory training was presented in two ways. One group of children received successive, uncorrelated sessions of auditory and reading training, an arrangement identical to that of the auditory-reading groups in Study I.

Another group of children received a combined auditory-reading program in which the reading curriculum was highly correlated with the auditory curriculum. Auditory skills presented were immediately reinforced visually and kinesthetically through reading and writing. In addition to reinforcing auditory skills, the program offered guided opportunity for the children to apply auditory skills to their reading. This combined auditory-reading program was designed to test the hypothesis derived from the original study that since the children seemed to have difficulties in transferring learned auditory skills to the reading situation on their own, guidance and practice in making such generalizations about skill use should result in increased reading achievement.

The combined auditory-reading program differed from the reading-only program and the reading portion of the successive auditory-reading program in that its major goal was the development and use of the specific auditory skills outlined in the curriculum as a means of decoding the printed word. Therefore reading activities revolved around the auditory curriculum. This necessarily put more limits on the nature of the remedial reading activities than did the successive auditory-reading program, where the tutors were free to introduce activities without regard to the auditory skills curriculum.

The auditory aspects of the successive and combined auditory-reading programs were based on an auditory curriculum which generally

Table 33

Allocation of Treatment Groups by Tutor and Time--Study II

	Tutor							
	1		2		3		4	
Time	Group Type	# of Children	Group Type	# of Children	Group Type	# of Children	Group Type	# of Children
9:15	Successive Auditory-Reading	3	Combined Auditory-Reading	2	Reading-Only	3	Successive Auditory-Reading	2
10:30	Reading-Only	3	Successive Auditory-Reading	3	Combined Auditory-Reading	3	Combined Auditory-Reading	3
1:00					Reading-Only	3		
Total Children By Tutor		6		5		9		5

corresponded to the curriculum developed for the original study and described in Chapter III. However, certain modifications in the curriculum were made for Study II.

The original study had devoted 50 sessions of 35 minutes each to the auditory program, or a total of approximately 30 hours of training. In evaluating that study the tutors questioned the necessity of devoting such a large amount of time to auditory skills (See Chapter V).

In Study II only 30 one-hour sessions of instruction were provided for all children. Those in the successive auditory-reading treatment group received 15 hours of instruction in auditory skills and 15 hours of instruction in reading. The children in the combined auditory-reading treatment group also received about 15 hours of auditory instruction which, however, was intermixed with reading instruction in the 30 one-hour sessions.

Since the amount of time devoted to the auditory curriculum in Study II was only half that of the original study, it was necessary to revise the original curriculum to fit the shorter time period. In the revision, every attempt was made to incorporate the results of the qualitative evaluation of the original auditory curriculum, discussed in Chapter V.

The auditory curriculum for Study II was again organized around four areas of instruction--recognition, discrimination, memory, and attentivity. The curriculum differed from that in the original study in the following ways:

1. A greater proportion of the time was devoted to the auditory concepts and skills needed in word analysis, at the expense of the memory skills involved in listening to and recalling stories. These latter skills were practiced on a simple level, but more advanced work with inference and organization of original stories was eliminated. It was felt that the primary goal of the auditory program was the development of proficiency in those skills needed in the decoding process. Work in the auditory memory area was done primarily in connection with learning these decoding skills.

2. The tutors were given more leeway in selection of the sequence in which they taught letter sounds. In Study II the first skills taught were still in the same sequence for all auditory treatment groups. The order of presentation was environmental sounds, oral commissions, and rhymes, including word families. Then letter sounds were introduced. It was agreed to teach single consonant sounds and consonant blends (in all positions in words), as well as long and short vowel sounds.

However, the tutors were free to teach the letter sounds in the order which would be most meaningful to their particular groups of children. A review of each tutor's detailed lesson records showed that all tutors actually followed a similar sequence in teaching sounds. They usually taught a few consonant sounds in all positions and then introduced vowel sounds so that the children would be able to relate isolated sounds to whole words as soon as possible. Even though the tutors independently followed a similar sequence they agreed that freedom to deviate from a fixed sequence was of great advantage in meeting the needs of the individual children and groups.

3. More emphasis was placed on developing the children's awareness of word structure. Attempts were made to teach the concepts of consonant and vowel and the concept of one spoken vowel per syllable. It was expected that these concepts would be much easier to teach in combined auditory-reading groups where visual reinforcement was permitted.

4. More emphasis was placed on blending isolated sounds into words. This was a difficult task to teach but with a combined reading and auditory approach the task was expected to be easier for the children to learn.

In summary, a new treatment group, a combined auditory-reading program, was added to Study II in place of an auditory-only treatment group. This program differed from the successive auditory-reading treatment group in that it correlated reading and auditory skills and gave the children guided opportunity to apply their auditory skills to the immediate reading situation.

VIII

Results

As in Study I, both quantitative analyses of the test scores and qualitative analyses of the program and the children's characteristics were undertaken. These analyses are reported below and their results discussed.

A. Analysis of Covariance

The quantitative analyses undertaken in Study II were essentially the same as those for Study I, reported in Chapter IV. Again, an analysis of covariance, using the IQ score and the pre-test scores as covariates, was done for each of the 27 dependent variables. However, the small N (34) allowed use of only a one-way analysis of covariance, to avoid zero frequency cells in the matrices. Therefore, treatment was the only independent variable; the independent variables previously used - time, tutor and ethnic group-could not be included in this statistical analysis. Table 34 reports the F's found in the analysis of covariance. There were significant F's for four reading scores and one auditory score. In the same manner as in Study I, multiple comparisons were carried out to ascertain whether the particular treatments which were hypothesized to be associated with significantly higher test scores actually were. More specifically, each mean score of the four groups was tested against every other group mean for the five reading and auditory socres which had significant overall F's. None of these comparisions yielded statistically significant differences in the means. Using the same procedures as in Study I, the combined mean of the three experimental groups was also compared with the mean of the control group for the same measures. Again, no statistically significant differences were found. Apparently, as in the previous study, the significant overall F's which resulted from the analysis of covariance were due to mean comparisons of combinations of variables not relevant in investigating the hypothesis of the study.

Thus, there was no evidence that the treatments used in Study II were different from each other in their effects on the auditory or reading scores, or that the scores of the combined treatment groups were different from those of the control group.

B. Pre-test to Post-test Improvement

To determine if there was score improvement from the pre-test to post-test, the same t-test analysis as reported for Study I was carried out with the Study II data. As before, the mean pre-test to post-test difference scores for the 27 dependent variables were tested for significance, holding constant the effects of IQ scores. The three experimental groups were combined into one group and the control group was analyzed alone.

Table 34

Analysis of Covariance Results

Dependent Variable	Treatment			IQ			Pre-test		
	df	MS	F	df	MS	F	df	MS	F
1. Gates PPR	3	0.04	<1	1	0.27	2.23	1	0.02	<1
2. Gates Oral Reading	3	76.18	4.18*	1	19.92	1.09	1	315.70	17.33**
3. Gates Sight Vocabulary	3	15.90	2.26	1	0.15	<1	1	203.83	28.91**
4. Roswell-Chall Sounds	3	388.65	14.44**	1	12.80	<1	1	340.36	12.65**
5. Roswell-Chall Words	3	13.02	3.46*	1	0.06	<1	1	74.42	19.79**
6. Roswell-Chall Syllables	3	2.90	<1	1	0.20	<1	1	7.35	1.34
7. Roswell-Chall Tot. Score	3	652.00	10.48**	1	11.82	<1	1	974.97	15.67**
8. Bender Gestalt I-Mem.	3	0.70	<1	1	8.23	3.61	1	7.24	3.18
9. Bender Gestalt I-Match.	3	0.87	<1	1	5.96	3.39	1	8.55	4.86*
10. Bender Gestalt II-Mem.	3	1.27	1.41	1	0.96	1.07	1	1.33	1.48
11. Bender Gestalt II-Match.	3.	1.72	1.32	1	0.00	<1	1	4.59	3.53
12. Sounds-Picture Ident.	3	0.05	<1	1	1.96	2.25	1	5.89	6.77*
13. Sounds-Labeling	3	1.37	<1	1	0.73	<1	1	23.95	12.54**
14. Words-Repetition	3	2.34	<1	1	4.00	<1	1	27.22	5.96*
15. Words-Picture Ident.	3	0.18	<1	1	0.25	<1	1	14.77	6.21*
16. Phonemes	3	6.97	<1	1	3.14	<1	1	51.33	4.24*
17. Word Pair Disc.	3	23.82	2.50	1	15.71	1.66	1	554.25	58.71**
18. Wepman	3	0.83	<1	1	3.82	<1	1	32.23	2.89
19. CNMT-Total	3	33.45	1.18	1	0.18	<1	1	233.18	8.25**
20. Memory-Sounds-Recall.	3	11.90	2.30	1	0.09	<1	1	12.44	2.41
21. Memory-Sounds-Recog.	3	3.22	<1	1	50.13	11.37**	1	29.47	6.68*
22. Memory-Words-Recall.	3	2.28	<1	1	9.04	2.58	1	6.11	1.75
23. Memory-Words-Recog.	3	34.80	3.83*	1	19.77	2.17	1	41.21	4.53*
24. CPT Reac. Time 101-2000 msec.	3	2573.27	<1	1	492.89	<1	1	56924.88	9.03**
25. CPT Reac. Time 101-1000 msec.	3	2016.29	<1	1	221.34	<1	1	35069.33	9.24**
26. CPT #Resp. 101-2000 msec.	3	44.93	1.32	1	11.31	<1	1	793.56	23.33**
27. CPT #Resp. 101-1000 msec.	3	34.92	<1	1	36.98	<1	1	1284.29	27.39**

*Significant at .05 level

**Significant at .01 level

The results, given in Table 35, show that the combined experimental group improved significantly on only one variable, the Word Pair Discrimination Test. The control group also made significant improvement on the same test, as well as on two reading scores, the Roswell-Chall Sounds and the Roswell-Chall Total score. There were no other score improvements shown on any other test for the two groups. Again, as in Study I, inspection of the raw scores for some of the reading tests indicated that they seemed to show improvement from pre-test to post-test.[1] Apparently the lack of significant results is attributable to the removal of the IQ score effect on the auditory and reading scores.

In summary, on only three of the auditory and reading tests, were there any differences in scores form the pre-test to the post-test periods, and most of the differences occurred in the control group. Thus, there was no evidence that the combined treatments resulted in improvement in auditory and reading scores.

C. Evaluation of the Curriculum

As in Study I, three areas were evaluated in the curriculum. They were: the nature of the auditory program; the opportunity for transfer of auditory skills to reading; and the time alloted for teaching auditory skills. Each is discussed below.

1. Nature of the auditory program. In the original study it was felt that strict adherence to the developmental sequence of auditory skills had hindered rather than helped the children's learning. A question was also raised as to whether a remedial auditory program might be more effective than a developmental one.[2]

In Study II, there was a more flexible sequence of the auditory curriculum in both the combined and separate auditory-reading groups, although greater flexibility was probably achieved in the combined auditory-reading group. An attempt was made to introduce auditory skills at the point at which they were most needed and most meaningful to the groups. At the same time, an effort was made in all groups to cover the entire range of skills included in the curriculum.

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[1] The pre-test and post-test means for each treatment group are shown in Appendix S.

[2] Because of the limited scope of Study II, it was not possible to incorporate a true remedial auditory treatment group. If resources had permitted, it would have been interesting to compare such a group with the other auditory-reading combinations.

Table 35

t Values For Mean Difference Scores from Pre-Test to Post-Test For the 27 Reading and Auditory Tests For Two Groups of Children

Dependent Variable	Experimental Group	Control Group
Gates PPR	-1.20	0.81
Gates Oral Reading	-0.77	1.16
Gates Sight Vocabulary	0.36	1.53
Roswell-Chall Sounds	1.45	2.13*
Roswell-Chall Words	0.46	1.31
Roswell-Chall Syllables	-0.09	0.89
Roswell-Chall Total Score	1.07	2.13*
Bender Gestalt I - Mem.	-0.29	-1.57
Bender Gestalt I - Match.	-1.84	0.87
Bender Gestalt II - Mem.	0.03	0.84
Bender Gestalt II - Match.	1.07	-0.48
Sounds-Pic. Ident.	0.85	0.47
Sounds-Labeling	0.26	0.63
Words-Repetition	0.61	1.45
Words-Pic. Ident.	1.22	0.71
Phonemes	0.72	0.06
Word Pair Disc.	2.46*	2.20*
Wepman	0.75	1.11
CNMT - Total	1.29	1.38
Memory-Sounds-Recall	1.02	1.32
Memory-Sounds-Recog.	-0.98	-0.46
Memory-Words-Recall	-1.33	-1.16
Memory-Words-Recog.	-1.89	0.04
CPT Reac. Time 101-2000 msec.	0.10	0.89
CPT Reac. Time 101-1000 msec.	0.59	-0.10
CPT # Resp. 101-2000 msec.	0.22	-0.43
CPT # Resp. 101-1000 msec.	0.53	-1.81

* Significant at .05 level

In evaluation of the program this dual purpose was seen to be reflected in the charts of daily activities (See Appendix R for a sample) which indicated that all tutors taught the same auditory skills, although there were day-to-day variations among tutors and among groups in order of presentation of skills. The tutors felt that despite the need to cover a particular range of material, the freedom to alter the sequence of presentation was very helpful in teaching the skills. Although the new program was felt to be an improvement, there still was question as to whether a remedial auditory program rather than a developmental one might have been more effective.

2. Opportunity for Transfer. The lack of guidance and practice in transferring auditory skills to reading was considered a major hindrance to reading achievement in the original study. In Study II, the combined auditory-reading program was designed to give maximum opportunity for such transfer. Unfortunately, there was less time for instruction in Study II than in Study I, so that the effects of the new program were not clear. Although the tutors felt that transfer was facilitated more in the combined auditory-reading program, even more stress in this area was seen to be needed.

3. Time. Because of the number of teaching sessions and in the length of each session in Study II, only half as much total time was devoted to the teaching of auditory skills as in the original study (15 hours in Study II as compared to 30 hours in Study I). The tutors were in agreement that there was not sufficient time in Study II to cover the auditory curriculum adequately. They all expressed a feeling of pressure to complete the curriculum. By contrast, they felt that in Study I too much time had been allocated to the auditory curriculum. Therefore the opinion was that the optimum time required to cover the material was probably between the 15 and 30 hours of the two studies.

In the original study it was noted that toward the end of the 50 sessions the children appeared to lose interest in the auditory curriculum, resulting in less efficient learning. This was particularly true of the auditory-only groups, where it appeared more difficult to sustain interest in the program. In Study II, such lack of interest was generally not observed. This may have been due to the fewer number of sessions or to the fact that no children received auditory training alone without reading instruction.

D. Evaluation of Pupil Progress

In Study II, as in the original study, the tutors felt that the children appeared to have learned the specific auditory skills presented in the program to a greater extent than they were able to demonstrate on the post-test measures. Tutor ratings were again obtained for each child concerning the amount of learning observed to have taken place on two auditory skills--consonant sounds and short vowel sounds. As before, children were rated for (A) their knowledge of consonant and short vowel sounds; (B) their ability to apply this knowledge to reading with help; and (C) the degree to which they applied this knowledge independently. These ratings were compared with the children's pre-and post-test performance on the Roswell-Chall Test-Sounds. The ratings and performance data are presented by treatment group in Table 36.

The pre-test performance on the Roswell-Chall-Sounds indicated that in terms of knowledge of consonant sounds, the reading-only groups at the start of treatment possessed fewer skills in this area than did the combined auditory-reading and separate auditory-reading groups; the latter two started with about the same degree of knowledge. None of the three groups demonstrated any pre-treatment knowledge of short vowel sounds.

A comparison of post-test Roswell-Chall performance with post-treatment tutor ratings (Section A,B,C in Table 36) indicates that, as in the original study, more learning was generally judged to have taken place in all three treatment groups than was demonstrated in the post-testing. This was true for both consonant and short vowel sounds, and seemed particularly noticeable in the reading-only groups, where there was a considerable discrepancy between tutor ratings and post-test performance in both consonant and vowel sounds. As suggested in Study I, perhaps the children's mastery of these skills may not have been solid enough to carry over to a testing situation.

The ratings and post-test performance both indicated that all groups appeared to make substantial gains in knowledge of consonant and short vowel sounds. The reading-only groups, which began treatment with a handicap in terms of knowledge of consonant sounds appeared to make the most gains in that area, while showing least gains in knowledge of short vowels. The separate auditory-reading groups appeared to make the greatest gains in knowledge of short vowels and they also seemed better able to demonstrate this knowledge on the post-test than did the combined auditory-reading groups.

Section B of Table 36 indicates that the tutors observed no differences among the three treatment groups in their ability to apply their knowledge of consonant sounds with help to a reading situation. Most children seemed capable of applying the knowledge they had. However, not all of the children in the groups were able to apply these skills independently, as shown in Section C of Table 36.

In the area of short vowel sounds, the separate auditory-reading groups were judged better able to apply their knowledge than were the other two treatment groups. In terms of independent application of this knowledge, the reading-only groups were judged to do the

Table 36

Pre-test and Post-test Roswell-Chall Test Performance and Tutor Judgement of The Extent to which Three Treatment Groups Learned and Applied Selected Auditory Skills to Reading after 30 Sessions.

(N=25)

	Combined Auditory-Reading N=8						Separate Auditory-Reading N=8						Reading Only N=9					
	Knows all or almost all 1		Knows at least half 2		Knows less than half 3		Knows all or almost all 1		Knows at least half 2		Knows less than half 3		Knows all or almost all 1		Knows at least half 2		Knows less than half 3	
Pre-test-R-C	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Consonant Sounds	1	12	4	50	3	38	2	25	3	38	3	38	-	-	2	22	7	78
Short Vowel Sounds	-	-	-	-	8	100	-	-	-	-	8	100	-	-	-	-	9	100
Post-test-R-C																		
Consonant Sounds	8	100	-	-	-	-	7	88	1	12	-	-	3	33	6	67	-	-
Short Vowel Sounds	2	25	1	12	5	63	4	50	1	12	3	38	-	-	1	11	8	89
Tutor Ratings-Post:																		
A. Has Skill																		
Consonant Sounds	8	100	-	-	-	-	8	100	-	-	-	-	7	78	2	22	-	-
Short Vowel Sounds	1	12	6	75	1	12	5	63	2	25	1	12	1	11	4	44	4	44
B. Can Apply Skill to Reading																		
Consonant Sounds	8	100	-	-	-	-	8	100	-	-	-	-	7	78	2	22	-	-
Short Vowel Sounds	1	12	3	38	-	-	5	63	2	25	-	-	1	11	2	22	-	-
C. Applies Skill Independently																		
Consonant Sounds	7	88	-	-	-	-	7	88	-	-	-	-	6	67	2	22	-	-
Short Vowel Sounds	-	-	1	12	-	-	1	12	2	25	-	-	-	-	2	22	-	-

best job, with the combined auditory-reading groups apparently least able to apply short vowel skills to reading on their own.

It would appear that, based on tutor observations, the separate auditory-reading groups were generally most successful in learning and applying short vowel sounds. There were no sizeable differences among the three treatment groups in terms of consonant sounds. Apparently the combined auditory-reading treatment groups were not superior to the other groups in the skills learned or applied to reading.

A comparison of Table 36 with Tables 26 and 27 of Study I indicates the following:

1. All auditory groups in both studies began treatment with about the same degree of knowledge of consonant sounds. All groups in both studies had minimum pre-treatment knowledge of short vowel sounds.

2. In comparing post-test Roswell-Chall performance, the reading-only groups had about the same scores in both studies on both skills but the separate auditory-reading groups did considerably better in Study II on both skills, despite fewer lessons.

3. There were no sizeable differences between Study I and Study II auditory groups or between the reading-only groups in the amount of tutor-observed learning of either consonant or short vowel sounds. This was true in spite of the fact that twice as much time was devoted to the auditory curriculum in Study I.

4. The separate auditory-reading groups of Study II, after 15 hours of instruction, were judged better able to apply their knowledge of short vowel sounds than were the comparable groups in Study I after 30 hours of treatment. The Study I reading-only groups seemed better able to apply their knowledge of short vowel sounds than those in Study II.

5. When considering independent application of the two skills, the Study II reading-only groups were observed to apply knowledge of both skills more frequently than their counterparts in Study I. The auditory groups in both studies showed no differences in their independent application of the two skills, except for the combined auditory-reading groups in Study II, which were observed to apply short vowel sounds to a lesser degree.

In summary, when the groups in Study II were evaluated for learning of consonant and short vowel sounds, more learning was observed to take place than was measured on the post-tests. Although there were few differences noted between groups, the separate auditory-reading group was generally the most successful in learning and applying some of the skills. In comparing these results with those from Study I, the differences that were found between groups in the two studies more often favored the groups in Study II, despite their having fewer lessons.

E. Evaluation of Pupil Characteristics

In the original study, it was felt that one factor which possibly contributed to the lack of clear-cut post-treatment differences among the treatment groups was pupil characteristics which interfered with effective learning. A similar situation seemed to prevail in Study II. Three areas, language development, reading skills development, and pupil behavior are discussed below.

1. Language Development. The children again appeared to show a low level of language development. Their vocabulary was limited, speech distortions were present, and it was necessary to teach most of the concepts needed to master the auditory curriculum.

2. Reading Skills Development. The same criteria were used to select the second sample as were used in the original study; groups were formed primarily on the basis of reading test performance. Every effort was made by the tutors to have the groups as homogeneous as possible in terms of skill needs and potential achievement. Personality characteristics were also taken into account. However, in spite of the care taken in forming the groups, wide ranges in ability and skill level again became apparent as the sessions progressed. Also, several children were found to have reading disabilities which would have been best handled in individual tutoring; in addition, two children had to be dropped from the study because of acting-out behavior problems.

3. Pupil Behavior. At the end of the 30 sessions in Study II, the tutors rated the children on the same behavior and personality characteristic checklist used in the original study. These ratings are summarized in Table 37 below.

Generally, there appeared to be few differences among the three Study II treatment groups in terms of pupil characteristics. The few exceptions were seen in the separate auditory-reading groups and the reading-only groups. In the separate auditory-reading groups the children were rated more able to concentrate on assigned tasks (C on Table 37) and to work independently (D); they also appeared to compete with other group members to a greater extent (F). These more favorable characteristics may in part explain the higher scores and ratings received by the groups on the consonant and short vowel sounds. The reading-only groups appeared to show less interest in the learning situation than did the two auditory groups (A).

A comparison with Study I tutor ratings (Table 29) indicated that in Study II the tutors were faced with about the same pupil character-

Table 37

Post-treatment Tutor Ratings of Behavior and Personality Characteristics of Individual Children by Total Sample and by Treatment Group

(N=25)

	Total Sample N=25		Treatment Group					
			Combined Auditory-Reading N=8		Separate Auditory-Reading N=8		Reading only N=9	
	f	%	f	%	f	%	f	%
TASK ORIENTATION								
A. General Attitude								
Eager or interested	18	72	7	87	7	87	4	44
Indifferent	5	20	1	12	-	-	4	44
Reluctant or Resistant	2	8	-	-	1	12	1	11
B. Reaction to Tasks								
Self-motivated	3	12	-	-	2	25	1	11
Capable of motivation	13	52	5	63	3	37	5	55
Selectively responsive	6	24	2	25	2	25	2	22
Infrequently or non-responsive	3	12	1	12	1	12	1	11
WORK HABITS								
C. Concentration on Task								
Almost always or usually	13	52	4	50	6	75	3	33
Sometimes	8	32	4	50	1	12	3	33
Seldom or never	4	16	-	-	1	12	3	33
D. Works Independently								
Almost always or usually	9	36	2	25	4	50	3	33
Sometimes	11	44	5	63	2	25	4	44
Seldom or never	5	20	1	12	2	25	2	22
GROUP INTERACTION								
E. Orientation to Group Work								
Always or generally co-operative	16	64	5	63	5	63	6	66
Erratic	6	24	3	37	2	25	1	11
Generally or almost always disruptive	3	12	-	-	1	12	2	22

Table 37 (continued)

			Treatment Group					
	Total Sample N=25		Combined Auditory-Reading N=8		Seperate Auditory-Reading N=8		Reading only N=9	
	f	%	f	%	f	%	f	%
F. Competes with other Group Members								
Almost always or usually	13	52	4	50	6	75	3	33
Sometimes	10	40	4	50	1	12	5	55
Seldom or never	2	8	-	-	1	12	1	11
G. Responds to Distracting Behavior								
Seldom or never	5	20	1	12	2	25	2	22
Sometimes	11	44	5	63	3	37	3	33
Usually or almost always	9	36	2	25	3	37	4	44
PERSONALITY CHECKLIST								
Self-confident	10	40	2	25	3	37	5	55
Cooperative (individual situation)	17	68	6	75	6	75	5	55
Compliant	11	44	3	37	4	50	4	44
Withdrawn	1	4	-	-	1	12	-	-
Seeks nurturance	5	20	2	25	1	12	2	22
Fearful	2	8	-	-	-	-	2	22
Domineering	2	8	-	-	1	12	1	11
Resents distraction	4	16	1	12	2	25	1	11
Low frustration level	8	32	3	37	2	25	3	33
Attention seeker	7	28	1	12	4	50	2	22
Verbally hostile	4	16	-	-	1	12	3	33
Physically aggressive	5	20	1	12	2	25	2	22
Negative	3	12	-	-	1	12	2	22

istics encountered in the original study: some difficulty in maintaining group cohesiveness due to distracting behavior; poor work habits including inability to concentrate on a task or to work independently; a low level of motivation toward learning; and children who, for the most part, could not work effectively in a group learning situation.

The one observed difference between the children in the two studies seemed to be in their repsonse to distracting behavior (G). It seems that a lower percentage of the children in Study II responded to the distracting behavior of others (36% versus 58%). This may have been due in part to two factors which had seemed to have adverse effects on the original study and which were eliminated from Study II. First, all tutoring in Study II was done in the schools, thus minimizing the degree of interruption in school routine which occurred among those children in the original study who travelled to the Institute for instruction. Secondly, there were no mixed sex groups in Study II. It was felt that in the original study the mixed sex groups were more prone to distractions. Apparently however, change in that pupil characteristic alone did not affect reading scores, since few score differences were found between groups in the two studies.

IX

Discussion

Study II, which was in part a replication of Study I but which also introduced a new treatment group, gave no support for the hypotheses set up for Study I. Not only did the replicated treatment groups fail to show improvement in reading and auditory scores but the new treatment group--the combined auditory and reading treatment--also failed to show score improvement. There were no post-treatment score differences among the treatment groups nor between the combined treatment groups and the control group. Thus, results of Study II are similar to those of Study I, despite the intended improvements added to the second study.

One factor which may be related in part to the lack of improvement was that the instruction time for the second study was considerably shorter than for the first, so that the results of the two studies are not strictly comparable. There was some evidence, based on tutor judgements, that the children in Study II did as well or better than children in Study I in learning and applying consonant and short vowel sounds. This may indicate more successful learning in the second study. However, it may also be due to increased tutor competence in using the programs. Equal time for instruction in each program is needed before the value of the new program can be ascertained. Therefore, the new treatment used in Study II may be evaluated as being possibly more effective in teaching the curriculum, but certainly no less effective than those used in Study I.

Tutor evaluation of the new combined auditory and reading treatment showed that its flexibility and increased opportunity for transfer of skills to reading were considered improvements but that more of both features were considered necessary. The tutors also felt that the limited teaching time hampered evaluation of the new program. In general, the tutors reacted favorably toward the new program and felt that its potential was good, but still desired further modifications in it for more efficient learning.

As before, skill learning was judged by the tutors to have taken place during the sessions. Those judgments, as well as the program improvements noted by the tutors, however, were not reflected in the test scores.

The sample of children chosen for the second study seemed to have similar learning characteristics to those in the first study, thus confirming that such characteristics were not peculiar to one sample of disadvantaged retarded readers. As in the first study, some of those characteristics were felt by the tutors to hamper learning. Amelioration of one characteristic, distractibility, did not have a noticeable effect on learning, and did not change the tutors' judgement that the children were difficult to teach. Thus again, the importance of pupil variables to learning is underlined.

In summary, the results of Study II showed that although there was possible promise in the combined auditory-reading treatment group, despite its limited tryout, other improvements in the program were still needed as there was no indication of its differences from the other treatment groups. No support was given the hypothesis by the results of Study II, but additional weight was given to the conclusion reached in Study I that pupil variables affected learning. In general, Study II confirmed the existence of the types of problems raised in Study I. Unfortunately, it did not solve them.

The theoretical issues raised in the discussion of Study I are, of course, equally applicable to the present study.

X

Conclusions

The results of Studies I and II did not support the hypotheses that the reading-auditory group would make the most improvement in reading while the control group would improve the least in reading skills. There was no evidence from the studies to show that any one experimental group was superior to the others or to the control group in facilitating reading learning. In Study I, the scores of the combined experimental groups were not significantly higher than scores of the control group from pre-test to post-test I. However, there was a time or possibly treatment effect in that some of the experimental groups did show significantly higher scores from post-test I to the other post-test periods. The combined auditory-reading treatment which was added in Study II to eliminate deficiencies of the treatments in Study I did not prove to be any more or less effective than did the other treatment groups. Thus, none of the various combinations of reading and auditory programs seemed to affect improvement in reading.

Error analyses of test items of some of the auditory and reading tests as well as tutors' evaluation of the pupils' learning of specific skills tended to support the quantitative findings that although some skill improvement had been shown after treatment, it was slight and the treatment groups could not be differentiated on such improvement.

In evaluation of the studies, the appropriateness of the auditory curriculum was questioned, especially in regard to its developmental sequence for third-grade retarded readers. In addition, it was judged that more teaching for transfer of auditory skills to reading was needed, even though more attention had been given to this area in Study II. There was also some concern about valid measurement of the auditory skills, since a factor analysis of the tests showed that the four areas of auditory skills set up for the study did not exist independently. The validity of the tests was also unknown. Therefore, it may be questioned whether the studies had provided good tests of the hypothesis.

Results from the analyses of covariance showed that there were some significant tutor, by treatment, and ethnic group by treatment effects for many of the auditory and reading tests. This evidence suggested that there may be interrelationships of teacher and pupil variables important in reading learning. The complexity of the findings was confirmed in part by qualitative evaluations of pupil personality and learning characteristics, which showed that such factors as poor work habits, inability to work independently, and distractibility seemed to hinder reading learning. Thus, the inconclusive results of the study may be due in part to complex interactions between treatment, pupil characteristics and teacher characteristics which were largely unmeasured in the study. Even so, on the basis of the results of the present studies, no support can be given to the contention that combinations of auditory and reading programs as tested in the studies were useful for retarded readers from socially disadvantaged backgrounds.

XI

References

Bond, G.L. The auditory and speech characteristics of poor readers. Teach. Coll. Contr. Educ., 1935, No. 657.

Chall, Jean S., & Feldmann, Shirley C. A study in depth of first-grade reading. Cooperative Research Project 2728, U.S.Office of Education, 1966.

Crossley, Alice B. Evaluation of the effect of lantern slides on auditory and visual discrimination of word elements. Unpublished doctoral dissertation, Boston Univer., 1948.

Deutsch, Cynthia. Auditory discrimination and learning-social factors. Speech given at Arden House Conference on Pre-School Enrichment of Socially Disadvantaged Children, December 1962.

Duggins, Lydia. Experimental studies in auditory perception in beginning reading. Bull. Southeastern Louisiana College, 1956, 12, 12-18.

Dunnett, C.W. J. Amer. statist. Ass., 1955, 50, 1096-1121.

Ewers, Dorothea W.F. Relations between auditory abilities and reading abilities; a problem in psychometrics. J. exp. Educ., 1950, 18, 239-262.

Fairbanks, G. Voice and articulation drillbook. (2nd ed.) New York: Harper and Row, 1960.

Goetzinger, C.P., Dirks, D.D. & Baer, C.J. Auditory discrimination and visual perception in good and poor readers. Annals of Otology, Rhinology, & Laryngology, 1960, 69, 121-136.

Graff, Virginia A. & Feldmann, Shirley C. Effective reading for the socially deprived child. J. Rehabilit., 1965, 31, 13-14.

Harman, H.H. Modern factor analyses. Chicago: Univer. of Chicago Press, 1960.

Harrington, Sister Mary James & Durrell, D.D. Mental maturity vs. perception abilities in primary reading. J. educ. Psychol., 1955, 46, 375-380.

Katz, Phyllis A. & Deutsch, M. Visual and auditory effeciency and its relationship to reading in children. Cooperative Research Project 1099, U.S. Office of Education, 1963.

Kennedy, H. A study of children's hearing as it relates to reading. J. exp. Educ., 1942, 10, 238-251.

Midgeley, J.D. Report to the Medical Research Council Committee on Education Treatment of Deafness, Unpublished. Reported in Vernon, M.D., Backwardness in Reading, Cambridge: Cambridge Univer. Press, 1957.

Miller, A.D., Margolin, J.S. & Yelles, S.F. Epidemiology of reading disabilities: some methodologic considerations and early findings. Amer. J. publ. Hlth., 1957, 47, 1250-1256.

Murphy, Helen A. Evaluation of specific training in auditory and visual discrimination on beginning reading. Unpublished doctoral dissertation, Boston Univer., 1943.

Nila, Sister Mary. Foundations of a successful reading program. Education, 1953, 73, 543-555.

Poling, Dorothy. Auditory deficiencies of poor readers. Suppl. educ. Monogr., 1953, 77, 107-111.

Pronovost, W. & Dumbleton, C. A picture-type speech sound discrimination test. J. speech. hear. Dis., 1953, 18, 258-266.

Reynolds, M.C. A study of the relationship between auditory characteristics and specific silent reading abilities. J. educ. Res., 1953, 46, 439-449.

Rizzio, N.D. Studies in visual and auditory memory span with special reference to reading disability. J. exp. Educ., 1939, 8, 208-243.

Scheffé, H. The analysis of variance. New York: John Wiley and Sons, 1958.

Thompson, Berta B. The relation of auditory discrimination and intelligence test scores to success in primary reading. Unpublished doctoral dissertation, Indiana Univer., 1961.

Wepman, J. Auditory discrimination, speech and reading. Elem. sch. J., 1960, 60, 325-333.

Wheeler, L.R. & Wheeler, Viola D. A study of the relationship of auditory discrimination to silent reading abilities. J. educ. Res., 1954, 48, 103-113.

Wolfe, L.S. Differential factors in specific reading disability: II. Audition, vision, verbal association and adjustment. J. genet. Psychol., 1941, 58, 57-70.

APPENDICES

Appendix A-1

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

SOUNDS--LABELING

Instructions for Administration

"WE ARE GOING TO LISTEN TO SOME SOUNDS. LISTEN CAREFULLY AND WHEN I NOD MY HEAD LIKE THIS (Nod head), TELL ME WHAT YOU HEARD."

Listen to dog barking. Record response. If child doesn't get it right, play it again. If he still gets it wrong, tell him: "THAT WAS A DOG BARKING. LET'S TRY ANOTHER ONE."

Proceed the same way with the telephone. If both examples are right or wrong, go on with the test.

Recording:

Check correct responses on record blank.
Record incorrect responses.

Appendix A-1

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

SOUNDS--LABELING

Answer Sheet

Name____________________ Examiner____________________

School____________________ Date____________________

Samples: dog barking

telephone ringing

1. car crash, screeching tires:____________________
2. sneeze:____________________
3. door creaking:____________________
4. telephone busy signal:____________________
5. gun battle, gunfire:____________________
6. kittens and cats:____________________
7. sawing wood:____________________
8. horse galloping:____________________
9. thunder:____________________
10. walking on steps:____________________
11. bell:____________________
12. hammering:____________________
13. humming:____________________
14. water dripping:____________________
15. woman laughing:____________________
16. whistling:____________________
17. clock ticking:____________________
18. woman talking:____________________
19. piano playing:____________________

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

PHONEME TEST

Instructions for Administration

"YOU ARE GOING TO HEAR SOMEONE SPEAKING THROUGH THESE EARPHONES. LISTEN CAREFULLY AND SAY EXACTLY WHAT SHE SAYS. IT WILL SOUND LIKE THIS."

Play tape. First example is "tay". If child does not respond, stop machine and say: "NOW SAY WHAT YOU HEARD."

Child responds.

"NOW WE WILL DO SOME MORE WITHOUT STOPPING THE MACHINE. REMEMBER, AS SOON AS YOU HEAR THE SOUND, SAY WHAT YOU HEARD, AND THEN LISTEN FOR THE NEXT ONE."

(examples: 2. ag 3. roo 4. shrow 5. sah)

Make sure child understands task before proceeding with test. He does not have to reproduce the phoneme correctly, but he must know he is to say what he hears.

Recording: Record the child's response exactly.

Appendix A-2

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

Phoneme Test

Answer Sheet

Name______________________________ Examiner______________

School____________________________ Date__________________

1. (k)i______________
2. i(p)______________
3. ă bat ____________
4. (l)i______________
5. i(ck)_____________
6. (pr)i_____________
7. (d)i______________
8. i(sh)_____________
9. (shr)i____________
10. (ah) calm ________
11. (pl)i____________
12. u(f)_____________
13. (m)i_____________
14. (thr)i___________
15. (ing)____________
16. (v)i_____________
17. i (m)____________
18. (g)i_____________
19. (r)i_____________
20. (aw) law ________
21. (sm)i____________
22. uh full _________
23. (b)i_____________
24. (gl)i____________
25. i(d)_____________
26. (f)i_____________
27. (bl)i black _____
28. (kw)i____________
29. (s)i sit ________
30. ith soft as in with
____
31. (fr)i____________
32. i(b)_____________
33. (sl)i____________
34. uch much ________
35. (z)i zoo ________
36. (n)i_____________
37. (w)i with _______
38. (fl)i____________
39. (th)i hard as in the
____
40. i(sk)____________
41. i(v)_____________
42. (skr)i___________
43. ĭ bit ___________
44. (br)i____________
45. (spr)i___________
46. (sk)i____________
47. ĕ bet ___________
48. (tr)i____________

Appendix A-3

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

WORDS--PICTURE IDENTIFICATION

Instructions for Administration

Present item No. 1 (sample) and say:

> "HERE ARE SOME PICTURES. YOU ARE GOING TO HEAR A WORD THROUGH THESE EARPHONES. WHEN I STOP THE MACHINE, YOU POINT TO THE PICTURE OF THE WORD YOU HEAR. BE SURE TO LOOK AT EVERY PICTURE BEFORE YOU POINT TO THE ONE YOU THINK IS RIGHT."

Listen to first word--"elephant". Stop machine. Child responds.

If correct, go on with test.

If incorrect, say:

"WHAT WORD DID YOU HEAR?"

If word is heard incorrectly, do not correct child, but go on to test.

If word is heard correctly, but picture wrong, say:

> "LOOK AT EACH PICTURE CAREFULLY AGAIN. WHICH ONE IS THE ELEPHANT?"

If child still does not point to correct picture, go on to test.

"NOW YOU WILL HEAR SOMEONE SAYING SOME MORE WORDS. BE SURE TO LOOK AT EVERY PICTURE BEFORE YOU POINT TO THE PICTURE OF THE WORD YOU HEARD."

Appendix A-3

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

Word Picture Identification

Answer Sheet

Name------------------------------- Examiner---------------------------

School------------------------------ Date------------------------------

Stimulus Word

1.	elephant	1 2 3 4 R (Sample)
2.	ring	1 2 R 4 5
3.	church	R 2 3 4 5
4.	hand	1 2 3 4 R
5.	wheel	1 R 3 4 5
6.	clown	1 2 3 R 5
7.	foot	1 2 3 4 R
8.	thumb	1 R 3 4 5
9.	tooth	1 2 3 R 5
10.	rug	1 2 R 4 5
11.	pipe	R 2 3 4 5
12.	bridge	1 2 3 4 R
13.	goat	1 2 3 R 5
14.	vest	1 2 3 4 R
15.	pail	1 2 R 4 5
16.	fish	1 R 3 4 5
17.	ear	1 2 3 4 R
18.	hammer	R 2 3 4 5
19.	bear	1 2 3 R 5
20.	matches	1 2 R 4 5

Appendix A-4

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

CLASSROOM NOISE MASKING TEST

Instructions for Administration

Seat S in a chair facing E. Tell S: "WE'RE GOING TO PLAY A GAME WITH SOME SOUNDS. AFTER YOU PUT ON THESE EARPHONES I'LL TURN ON THE TAPE RECORDER. THEN YOU'LL HEAR A LADY TALKING. SHE'LL TELL YOU HOW TO PLAY THE GAME." Put one pair of earphones on S. Put the other set (with unbent wire frame) on yourself. Leave one ear free of the phone to listen to S's responses. Cover the other ear with an earphone so you can count the stimuli. Play the taped instructions. These are as follows:

(You are going to hear some words. The game is to tell what the words are as fast as you can. The first time you hear a word there will be a lot of noise so it will be hard to tell what the word is. The noise will sound like this Mask #1 . After that the same word will be played again. Each time it is played there will be a little less noise so it will be easier to tell what the word is. Say the word out loud as soon as you think you know what it is. The first word will be practice. Listen carefully.)

Stop the machine after S has heard the instructions. Answer any questions. Play the practice series.

Stop the machine after the first step and ask S: "WHAT DID YOU HEAR? DID YOU HEAR A WORD?" Play the second step and stop the machine again. Ask: "DID YOU HEAR A WORD? WHAT IS IT?" Play the rest of the practice series. Stop after each step and ask S if he knows the word. After S has correctly identified the word--unless he has identified the last step--tell him that he is correct and then say: "I'LL PLAY THE REST OF THIS FOR YOU SO YOU CAN SEE HOW THE WORD GETS EASIER TO HEAR." After this tell S: "NOW WE'LL TRY ANOTHER WORD. REMEMBER, THE GAME IS TO SEE HOW FAST YOU CAN TELL ME WHAT THE WORD IS."

Play the remaining series. Stop the machine after each stimulus and ask S if he can tell you the word. Use minor variations of the basic prompt: "CAN YOU TELL ME NOW?" When an S correctly identifies a word tell him: "THAT'S RIGHT. NOW WE'LL TRY A DIFFERENT WORD." Move the tape ahead to the next strip of white leader tape (at the start of the next series). Whenever an S makes an incorrect response to a stimulus tell him: "TRY AGAIN." When an S hears an entire series without making the correct response tell him: "NOW WE'LL TRY ANOTHER WORD. SEE HOW FAST YOU CAN TELL ME WHAT IT IS."

Recording:

Record all responses to each step verbatim. Mark the completely correct response by a check mark in the appropriate box.

Appendix A-4

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

Name____________________

School____________________

Examiner____________________

Date____________________

CLASSROOM NOISE MASKING TEST

Answer Sheet

STIMULUS WORD	STEP NUMBER						
	1	2	3	4	5	6	7
CATCH (practice word)							
TELEPHONE							
ICE							
QUIET							
JUMP							
SIDEWALK							
DOWNSTAIRS							
UMBRELLA							
WASH							
BANANA							
FOLLOWING							

E EXAMINER'S COMMENTS:

Appendix A-5

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

SOUNDS--PICTURE IDENTIFICATION

Instructions for Administration

Present example No. 1 and say:
"HERE ARE SOME PICTURES."

Point to each picture and say:
"THIS PICTURE IS A BELL, THIS PICTURE IS A WHISTLE, THIS PICTURE IS A TELEPHONE, THIS PICTURE IS A CAR.
YOU ARE GOING TO HEAR A SOUND ON THE TAPE RECORDER. LISTEN CAREFULLY AND POINT TO THE PICTURE OF THE SOUND YOU HEARD."

Help child put on earphones. Play first example (telephone).

Child responds.

If response is correct, go on to example 2.

If incorrect, stop machine, say:

"WHAT SOUND DID YOU HEAR?"

If sound is heard incorrectly, and child pointed to picture of sound he heard, go on to example 2.

If sound heard correctly, but picture wrong, correct child by pointing to correct picture and then reviewing the names of the other pictures. Then go on to example 2.

"THAT'S RIGHT. NOW LET'S TRY ANOTHER ONE."

Turn to example 2 (dog barking). Without identifying the pictures for the child, play stimulus sound. Give child chance to respond.

If correct, proceed with test.

If incorrect, follow procedure for incorrect response to example 1, and then go on to tape.

"NOW WE ARE GOING TO HEAR MORE SOUNDS. LISTEN CAREFULLY, AND WHEN I STOP THE MACHINE, POINT TO THE PICTURE OF THE SOUND YOU HEARD."

Appendix A-5

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

SOUNDS--PICTURE IDENTIFICATION

Answer Sheet

Name______________________ Examiner______________________

School______________________ Date______________________

A. Telephone	1 2 R 4		
B. Dog Barking	1 2 3 R		
1. airplane	1 r 2 4	11. children playing	1 R 3 4 5
2. glass breaking	R 2 3 4	12. sea lion	R 2 3 4 5
3. door (open and close)	1 2 R 4 5	13. water pouring into bucket	1 2 R 4 5
4. train	1 R 3 4 5	14. applause	1 2 3 4 R
5. typewriter	1 2 3 R 5	15. ping pong	1 2 R 4 5
6. fire engine	1 2 3 4 R	16. rowboat	R 2 3 4 5
7. baby crying	R 2 3 4	17. eating an apple	1 2 3 R 5
8. birds	1 R 3 4 5	18. knocking on door	1 R 3 4 5
9. card shuffling	1 2 3 4 R	19. paper crumpling	1 2 3 4 R
10. cow	1 2 3 R 5	20. ball bouncing	1 2 R 4 5

Appendix A-6

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

WORDS--REPETITION

Instructions for Administration

"YOU ARE GOING TO HEAR SOMEONE SAYING SOME WORDS. LISTEN CAREFULLY AND SAY THE SAME WORDS SHE SAYS."

Start machine. The first word is "door". Stop after word. If child does not respond, say:

"SAY THE WORD YOU HEARD. (Child responds.) NOW WE'LL DO SOME MORE WORDS WITHOUT STOPPING THE MACHINE. REMEMBER, AS SOON AS YOU HEAR THE WORD, SAY WHAT YOU HEARD, AND LISTEN FOR THE NEXT WORD."

(Do the sample words, making sure child understands the task before proceeding with test. He does not have to reproduce the word correctly, as long as he understands that he is to say what he hears.)

Sample words: door, ice.

Recording: check correct responses
record incorrect responses--any response which does not reproduce the word as it is said on the tape

Appendix A-6

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

WORDS--REPETITION

Answer Sheet

Name____________________ Examiner____________________

School____________________ Date____________________

Samples: door - ice

1. wash____________________
2. bathe____________________
3. half____________________
4. yet____________________
5. scream____________________
6. lie____________________
7. fixed____________________
8. show____________________
9. grass____________________
10. use____________________
11. bark____________________
12. catch____________________
13. cent____________________
14. stove____________________
15. pig____________________
16. vegetable____________________
17. their____________________
18. ribbon____________________
19. across____________________
20. telephone____________________
21. again____________________
22. change____________________
23. square____________________
24. marry____________________
25. thing____________________
26. measure____________________
27. newer____________________
28. blue____________________
29. saw____________________
30. give____________________

Appendix A-7

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

WORD PAIR--PICTURE DISCRIMINATION TEST

Instructions for Administration

1. The examiner is seated beside the child. Testing conditions should be as quiet as possible. Use a normal volume so that the child can hear you easily. Use a monotone in reading the sample words. Articulate clearly, but do not exaggerate.

2. Place the picture sheets in numbered sequence, face up, in a pile in front of the child.

3. Use pictures A, B, and C for familiarization instruction as follows:

   "HERE ARE SOME PICTURES WE ARE GOING TO LOOK AT. EACH PAGE HAS THREE PICTURES ON IT LIKE THIS."

   Frame first picture and block out other two, say:

   "THIS IS A PICTURE OF A SKIRT-SKIRT."

   Frame second picture and say:

   "THIS IS A PICTURE OF A SHIRT-SHIRT."

   Frame third picture and say:

   "THIS IS A PICTURE OF A SHIRT-SKIRT."

   Remove framing and say:

   "POINT TO SKIRT-SKIRT. (Child points.) POINT TO SHIRT-SKIRT. POINT TO SHIRT-SHIRT."

   Make sure child has made correct responses. If he has, put earphones on and say:

   "NOW LISTEN CAREFULLY AND POINT TO THE PICTURE OF THE WORDS YOU HEAR:

   (On tape: checks-checks) Examiner turns page. (bag-bug)

   Go on with test if child demonstrates understanding of task.

   Repeat both taped examples if child does not understand.

Appendix A-7

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

WORD-PAIR PICTURE DISCRIMINATION TEST

Answer Sheet

Name______________________________ Date______________________________

School______________________________ Examiner______________________________

A.	Sample				
B.	checks - checks	1 2 R			
C.	bag - bug	R 2 3			
1.	rock-lock	1 2 R	16.	pans - pants	1 2 R
2.	knot- nut	1 R 3	17.	hole - hole	1 R 3
3.	pin - pin	1 2 R	18.	soldier - shoulder	1 2 R
4.	chip - ship	R 2 3	19.	robe - road	1 R 3
5.	wash - watch	1 2 R	20.	tent - tent	1 2 R
6.	vase - face	1 2 R	21.	soup - suit	1 2 R
7.	cone - cone	1 R 3	22.	wings - winds	1 R 3
8.	cap - cat	1 2 R	23.	cook - cooks	R 2 3
9.	bag - back	R 2 3	24.	fort - fork	1 2 R
10.	coat - coke	R 2 3	25.	lamp - lamp	1 2 R
11.	pig - peg	1 2 R	26.	story - starry	1 R 3
12.	shave - shave	R 2 3	27.	pick - pick	R 2 3
13.	broom - room	1 R 3	28.	heart - art	R 2 3
14.	bees - bees	R 2 3	29.	ear - year	1 R 3
15.	seed - seat	R 2 3	30.	hole - hall	R 2 3

Appendix A-7

WORD-PAIR PICTURE DISCRIMINATION TEST

Answer Sheet

31.	gum - gum	1 2 R
32.	shells - shelves	R 2 3
33.	pig - pick	1 R 3
34.	seat - seat	1 2 R
35.	store - straw	1 R 3
36.	shade - shave	1 2 R
37.	pans - pans	1 R 3
38.	picture - pitcher	1 2 R
39.	robe - robe	R 2 3
40.	six - sits	R 2 3
41.	cook - cook	1 2 R
42.	bread - braid	R 2 3
43.	shells - shells	1 2 R
44.	three - tree	1 2 R
45.	pen - pin	R 2 3

Appendix A-8

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

MEMORY TEST

Instructions for Administration

WORDS (Items A & B)

Say to child:

"YOU ARE GOING TO HEAR SOMEONE SAYING SOME WORDS THROUGH THE EARPHONES. LISTEN CAREFULLY, BECAUSE I WILL ASK YOU SOME QUESTIONS ABOUT THEM IN A LITTLE WHILE. LISTEN VERY CAREFULLY."

In box on answer sheet, note time when recall should begin. (10 minutes after end of stimulus words).

Go on to intervening task.

Recall

At end of 10 minutes say:

"YOU REMEMBER THAT YOU HEARD SOMEONE SAYING SOME WORDS A LITTLE WHILE AGO. I WOULD LIKE YOU TO TELL ME AS MANY OF THEM AS YOU CAN REMEMBER."

Indicate on answer sheet the numerical order in which child recalls the exact word. If he recalls a word not played write it in at the bottom of the Recall column.

The child may need to be encouraged to recall more words. "SEE IF YOU CAN REMEMBER ANOTHER WORD YOU HEARD." When it is obvious he can recall no more, go on to Recognition.

Recognition

"NOW I AM GOING TO PLAY SOME WORDS. LISTEN CAREFULLY, AND TELL ME IF YOU HEARD THE SAME WORD A LITTLE WHILE AGO. SAY "YES" IF IT IS A WORD YOU HEARD A LITTLE WHILE AGO, AND SAY "NO" IF IT IS NOT A WORD YOU HEARD A LITTLE WHILE AGO."

Make sure child understands what he is to do. Play Recognition words. Put a mark in "yes" or "no" column for each word.

Go on to Item B. Say:

"NOW WE ARE GOING TO TRY THIS AGAIN. YOU ARE GOING TO HEAR SOMEONE SAYING SOME MORE WORDS ON THE TAPE RECORDER. LISTEN CAREFULLY, BECAUSE I WILL ASK YOU SOME QUESTIONS ABOUT THEM IN A LITTLE WHILE. LISTEN VERY CAREFULLY."

Follow same procedure as for Item A.

Appendix A-8

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

MEMORY TEST

Answer Sheet

Name________________________ Examiner________________________

School________________________ Date________________________

WORDS

A. Stimulus Words (Intervening Task: pick up sticks)

	Recall (Indicate Order)	Recognition	Yes	No		Yes	No
1. hammer		1. fish			11. hammer		
2. change		2. pail			12. jam		
3. heart		3. year			13. picture		
4. fish		4. ribbon			14. king		
5. picture		5. goat			15. bark		
6. goat		6. change			16. moon		
7. moon		7. table			17. pick		
8. catch		8. walk			18. friend		
9. ribbon		9. heart			19. know		
10. jam		10. fire			20. catch		

Time

Appendix A-8

MEMORY TEST

Answer Sheet

B. Stimulus Words (Intervening Task: Drawing)

	Recall (Indicate Order)
1. matches	
2. broom	
3. show	
4. use	
5. soldier	
6. foot	
7. bear	
8. gum	
9. marry	
10. pin	

Recognition

	Yes	No		Yes	No
1. clown			11. pin		
2. pet			12. sleep		
3. gum			13. matches		
4. give			14. hole		
5. show			15. cook		
6. foot			16. soldier		
7. child			17. use		
8. meet			18. marry		
9. girl			19. farm		
10. broom			20. bear		

Time	

Appendix A-9

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

MEMORY TEST

Instructions for Administration

ENVIRONMENTAL SOUNDS (Items C & D)

> "NOW YOU ARE GOING TO HEAR SOME SOUNDS ON THE TAPE RECORDER. LISTEN CAREFULLY, BECAUSE I WILL ASK YOU SOME QUESTIONS ABOUT THEM IN A LITTLE WHILE. LISTEN VERY CAREFULLY."

In box on answer sheet, note time when recall should begin (10 minutes after end of stimulus words).

Go on to intervening task.

Recall

At end of 10 minutes say:

> "YOU REMEMBER THAT YOU HEARD SOME SOUNDS A LITTLE WHILE AGO. I WOULD LIKE YOU TO TELL ME AS MANY OF THEM AS YOU CAN REMEMBER."

Indicate on answer sheet the numerical order in which child recalls sound. If he recalls a sound not played, write it in at the bottom of the Recall column.

The child may need to be encouraged to recall more sounds. "SEE IF YOU CAN REMEMBER ANOTHER SOUND YOU HEARD." When it is obvious he can recall no more, go on to Recognition.

Recognition

> "NOW I AM GOING TO PLAY SOME SOUNDS. LISTEN CAREFULLY AND TELL ME IF YOU HEARD THE SAME SOUND A LITTLE WHILE AGO. SAY "YES" IF IT IS A SOUND YOU HEARD A LITTLE WHILE AGO, AND SAY "NO" IF IT IS NOT A SOUND YOU HEARD A LITTLE WHILE AGO."

Make sure child understands what he is to do. Play Recognition sounds. Put a mark in "yes" or "no" column of each sound.

Go on to Item D. Say:

> "NOW WE ARE GOING TO TRY THIS AGAIN. YOU ARE GOING TO HEAR SOME SOUNDS ON THE TAPE RECORDER. LISTEN CAREFULLY, BECAUSE I WILL ASK YOU SOME QUESTIONS ABOUT THEM IN A LITTLE WHILE. LISTEN VERY CAREFULLY. ......

Follow same procedure as for Item C.

Appendix A-9

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

MEMORY TEST

Answer Sheet

Name____________________ Examiner____________________

School____________________ Date____________________

II. ENVIRONMENTAL SOUNDS
C. Stimulus Sounds (Intervening Task: Bender Form I)

Time	Recall (Indicate Order)
1. fire engine	
2. birds	
3. woman talking	
4. water pouring	
5. hammering	
6. cats	
7. sea lion	

Recognition

	Yes	No
1. alarm clock		
2. sea lion		
3. woman talking		
4. paper crumpling		
5. police whistle		
6. birds		
7. telephone		

	Yes	No
8. water pouring		
9. fire engine		
10. woman laughing		
11. hammering		
12. crowd cheering		
13. pin ball machine		
14. cats		

Appendix A-9

MEMORY TEST

Answer Sheet

D. Stimulus Sounds (Intervening Task: Bender Form II)

______ Time

Recall (Indicate Order)

1. crying ______
2. train ______
3. gun ______
4. humming ______
5. dog ______
6. ping pong ______
7. cow ______

Recognition

	Yes	No
1. gun		
2. ping pong		
3. whistling		
4. lion roaring		
5. sawing		
6. crying		
7. rowboat		

	Yes	No
8. dog		
9. train		
10. cow		
11. car horn		
12. cards shuffling		
13. chickens		
14. humming		

Appendix A-10

INSTITUTE FOR DEVELOPMENTAL STUDIES
Department of Psychiatry
New York Medical College

CONTINUOUS PERFORMANCE TEST - AUDITORY

Instructions for Administration

E seats S so that he can easily hear the stimuli, and says: "WE ARE GOING TO LISTEN TO SOMEBODY SAYING A LOT OF COLORS." E shows button to S, and says: "YOUR JOB IS TO PRESS THIS BUTTON AS SOON AS YOU HEAR RED. DON'T PRESS IT WHEN YOU HEAR ANY OTHER COLOR, BUT ALWAYS PRESS IT AS SOON AS YOU HEAR THE COLOR RED. JUST TRY PRESSING THE BUTTON." S should press the button a couple of times to see how it goes. Then E says: "NOW WE ARE GOING TO PRACTICE A LITTLE. REMEMBER, PRESS THE BUTTON EVERY TIME YOU HEAR THE COLOR RED, AS FAST AS YOU CAN. DON'T PRESS THE BUTTON FOR ANY OTHER COLOR. READY?"

Then E turns the tape recorder to "PLAY" and lets S respond to the stimuli. If S is slow in pressing the botton to RED, E says: "PRESS AS SOON AS YOU HEAR RED." If S presses to other colors, E says: "PRESS ONLY WHEN YOU HEAR RED, NOT TO ANY OTHER COLOR." If S persists in holding down the button, E says: "TAKE YOUR HAND OFF THE BUTTON. ONLY PRESS WHEN YOU HEAR RED, NOT TO ANY OTHER COLOR." At the end of practice trials, E turns the machine to "STOP" and says: "GOOD!" to S.

E then says to S: "NOW WE ARE GOING TO DO SOME MORE. REMEMBER TO PUSH THE BUTTON EVERY TIME YOU HEAR THE COLOR RED. DON'T PUSH THE BUTTON FOR ANY OTHER COLOR. READY?" E then turns the tape recorder to "PLAY" and lets S respond to the stimuli. At the end of the taped words, E turns the machine to "STOP" and says: "THAT WAS VERY GOOD."

Appendix B

Sample Reading Lesson

Record Form for Tutoring

Date May 14, 1964 Tutor__________ Session Number 44__________ Group II__________

Present: 1.__________ 2.__________ 3. __________ 4.__________

Silent Reading	Oral Reading	Skill Instruction	Other Activities
Library Books Bobby--Two is a Team Andy--Curious Cow Hector--Caps for Sale	Reading from library books	new words flies their tries there cries	Identify pictures on p. 37--tell what they are used for
Peter & the Big Balloon p. 37		rays airfield	Finish Freddy's Summer Vacation
What other animals did doctor Dan send up into space--	Read what Dr. Dan said Read what Mr. Sills said	Read these words and tell me sound of vowel-- pup - pot - him pet - lap	
What was the dog's name--	Yes-No Sheets--(tutor-made) -- for oral reading and comprehension		
Tell how he trained a dog to go up into space		Read: wine, rope, hate--tell sound of vowel	

Comments:

The 3 pictures on p. 37 were a thermos jug, an onion, and a microscope--no boy could name these objects--although they recognized them.

Appendix C

Sample Play Session

Record Form for Group Playtime

Date 4/28/64 Tutor ______ Session Number 36 Group I

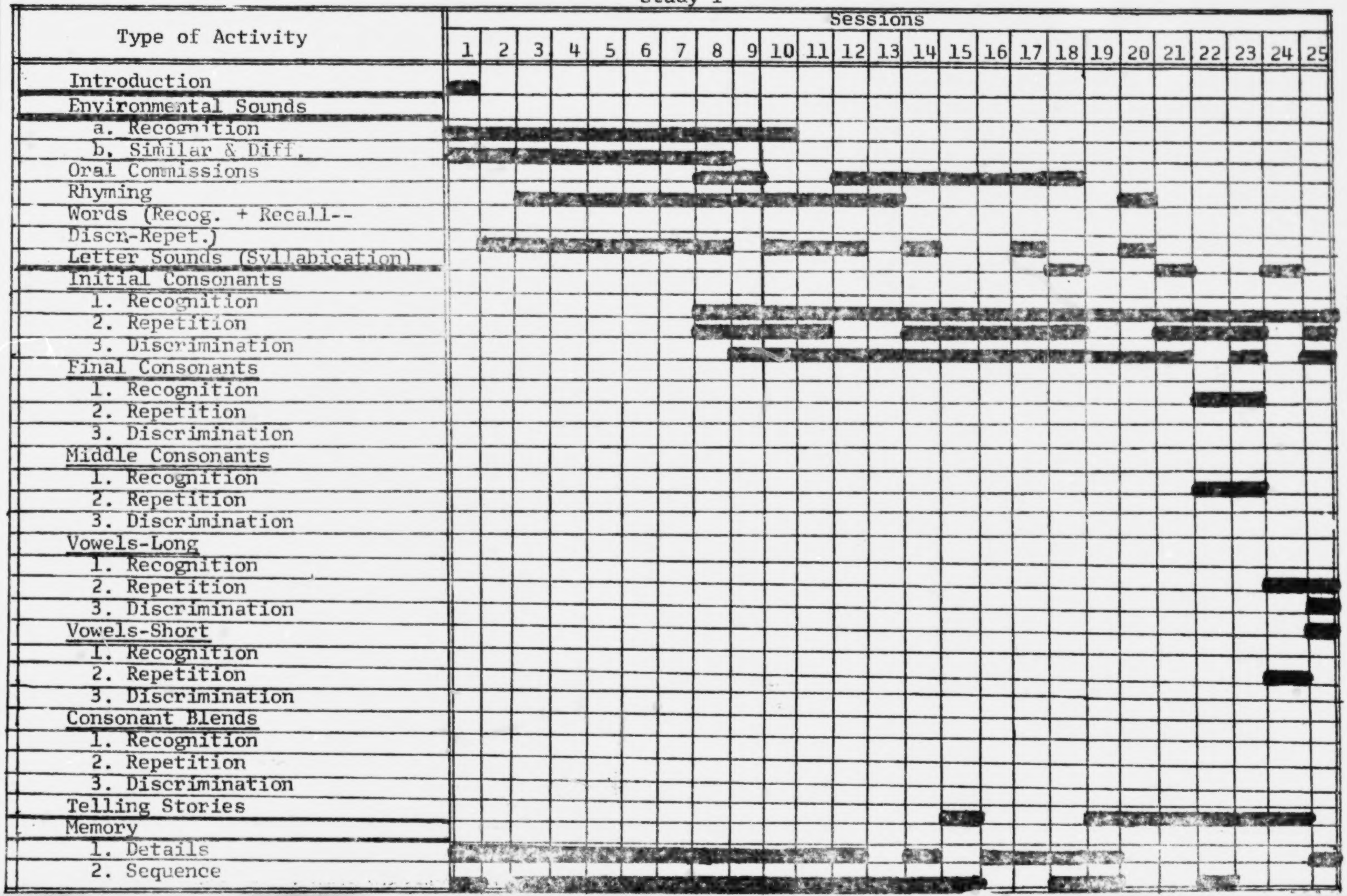
Present: 1. ______ 2. ______ 3. ______ 4. ______

Activities and Materials	Comments
Jamie drew pictures. The girls and teacher played Bingo. The girls then played Pick-up-Sticks. Teacher played Old Maid with Jamie.	Jamie draws the same faces every day. Sometimes he colors them brown. Sometimes he leaves them white. They always have pointed heads and widely spaced eyes.

Appendix D

Auditory Skills Taught in Each Lesson to One Group

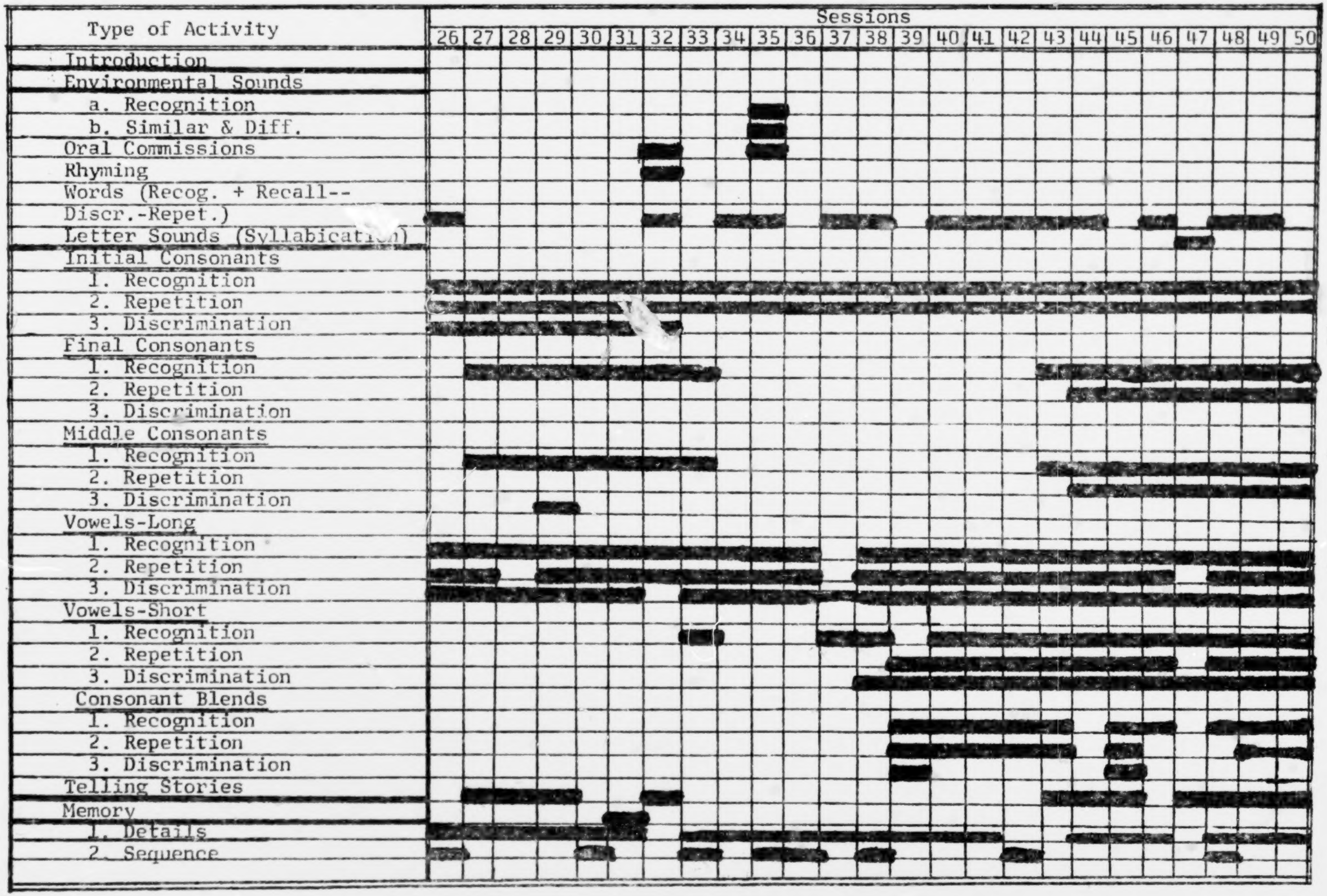
Study I



Appendix D (continued)

Auditory Skills Taught in Each Lesson to One Group

Study I



Appendix E

Auditory Curriculum: A Representative List of Activities

I Environmental Sounds

1. Identification and Labeling

   a. Commercial records: city and country sounds from "Muffin in the City" and "Muffin in the Country" were identified and recalled (dog barking, car, horns, train, cow, birds, etc.)

   b. Classroom noises: with eyes closed, the children (1) listened for and identified sounds in classroom or halls (door closing, clock ticking, someone walking, etc.), (2) identified sounds made by teacher (pencil dropping, ping fingers, etc.), and (3) identified sounds made by a child who was "it."

2. Discussion of Similarities and Differences

   Children were encouraged to note and discuss large and small differences in environmental sounds -- e.g., the difference between the ticking of a clock and tapping the table with a pencil. The teacher pointed out, with examples, that words could sound very different or very much the same. (The concepts of "same" and "difference were tuaght here if needed).

II Following Directions

1. Oral Commissions

   a. Through the use of games such as "Simon Says" the children were given simple tasks to carry out--such as opening the door, jumping up and down, etc. The number of tasks in a commission was increased gradually. The children were encouraged to repeat the assigned tasks before performing them. The group determined whether or not the assigned tasks had been carried out correctly.

b. The children were asked to draw specified objects (three blue circles, two red lines, etc.,) These tasks gradually increased in complexity.

c. All aspects of the lesson were utilized to develop skill in listening to and following direction: in working with letter sounds, for example, the children were periodically asked to recall the instructions given by the teacher; in listening to stories for answers to specific questions, the children were checked for understanding of the task. Care was taken to insure that the children understood all the terms used in assigning tasks.

III Words

1. Repetition

a. The "Telephone" game was played, in which a whispered message was sent around the circle of children. The last child repeated the message aloud, and it was compared with the original message to point up the fact that small changes in sound may lead to large changes in meaning.

b. Children repeated words and phrases spoken by tutor or other children. Some choral speaking was used.

2. Rhymes

a. The concept of rhyming was introduced through the use of jingles and poems, beginning with material familiar to the children. The children were encouraged to contribute poems, songs, television commercials, etc.

b. The children identified rhyming words in poems, sets of words, etc.

c. The children supplied rhyming words in riddles ("I'm thinking of a color that rhymes with head") or added to a list of rhyming words (may, hay, play...)

3. As the concept of rhyming was mastered, discussion was encouraged concerning other ways in which words sounded different--beginnings, middles, length, number of "beats" (syllables).

4. Word Parts

   a. The children listened for and identified common word endings (s, er, ing, est).

   b. Children counted syllables by "beating" them out with hand or pencil.

IV Sounds of Letters and Letter Combinations

1. Introduction: a sound was presented in the initial position in whole words. Whenever possible this was done through the use of interest-catching material such as short poems, jingles, or alliterative sentences.

2. Recognition and discrimination: a child was assigned a particular sound to listen for at the beginning of words spoken by the tutor, or he was assigned a task to perform when he heard the sound (raise his hand, stand up, etc.) The child was encouraged to repeat the words spoken by the tutor. The discriminations the children were asked to make gradually became finer.

3. Supplying words with a particular initial sound: children were asked to supply words for riddles (I'm thinking of a color that begins like "rabbit") or for games (I'm going on a trip and am going to take things that begin like 'fish".) or for categories of words (foods or names that begin like "mouse") or to draw pictures of something beginning with a particular sound.
4. Repetition of the sound in isolation: in this step the children were made aware of how a sound is formed in the mouth.
5. Association of sound with letter name and form: this step usually followed automatically from the previous steps, with little teaching. In some cases picture clues were used to facilitate the associations.
6. Recognition and discrimination of sounds in final and medial positions in words: activities similar to those described above were used to practice this skill. Children might indicate the position of a sound by marking "beg., middle, or end" locations on a blackboard or chart.

V Blending

A minimum of time was devoted to this skill due to the difficulty in attempting to teach without visual reinforcement. Practice was primarily imitation of the tutor.

VI Listening to Stories.

Stories were read by the tutor or presented in the form of commercial records. Children were asked to recall the story in sequence, or were asked to listen for specific details. They were asked to anticipate the outcome of events. Considerable repetition of the story was done to pick up omitted details.

VII Telling Stories

The children retold stories they had heard, or they created original ones. The emphasis was on making themselves understood (the tutor asked questions to guide a child as he was telling his story) and on planning a logical sequence of presentation.

Sample Auditory Lesson

Record Form for Auditory Training

Date 3/4/64 Tutor________ Session Number 13 Group II

Present: 1.________ 2.________ 3.________ 4.________

Activities and Materials	Recognition	Auditory Discrimination	Memory	Attentivity
1) Reviewed consonants in various positions in word--marked on chart on wall.	1) Of consonant sound, & its place in word. Practice in saying the word correctly.	1) Among similar sounds and between different positions in words.		1) Which consonant are we listening for?
2) Introduced new letter (l) in beginning position.	2) Recognition of sound in word, supplying of words beginning with "l"	2) Between "l" and similar sounds.		
3) Discussed concepts of beginning, middle, end. Illustrated with 3 children in different positions.	3) Understanding of concepts.			
4) Oral commissions--drawing. child restated task. child did not restate task.	4) Understanding the task .		4) Memory for assigned task. Discussed how to remember.	4) Paying attention to only one's own work--discussed distraction of listening or watching others.
5) How to pronounce "teeth" (teef).	5) Learning correct sound elements of word.			

Comments: The concepts of position gave some trouble today, particularly to Helen. Helen also had much difficulty with the oral commissions. Again, her biggest problem seems to be attentivity. The other two seem to take the lessons more "seriously" than she does, and Gail is really making strides.

Appendix G

F Ratios for the Treatment by Time by Tutor Analysis of Covariance

Dependent Variable	Main Effects			Interaction Effects				Covariates	
	Treat-ment	Time	Tutor	Treat-ment x Time	Treat-ment x Tutor	Time x Tutor	Treat-ment x Time x Tutor	IQ	Pre-test
Gates PPR	<1	10.18**	1.89	1.15	1.44	<1	<1	<1	<1
Gates Oral Reading	9.74*	16.90**	5.28**	1.01	2.50*	1.01	<1	6.09*	26.87**
Gates Sight Vocabulary	3.78*	25.62**	2.65	<1	2.25*	<1	<1	10.62**	12.34**
Roswell-Chall Sounds	2.00	2.06	5.29**	<1	1.37	<1	<1	1.17	10.76**
Roswell-Chall Words	1.90	11.53**	16.33**	<1	2.53*	<1	<1	<1	12.88**
Roswell-Chall Syllables	2.06	16.15**	2.22	<1	4.41**	1.52	<1	23.88**	<1
Roswell-Chall Total Score	<1	4.00*	9.08**	<1	<1	<1	<1	3.45	12.70**
Bender-Gestalt I - Mem.	1.86	2.95	<1	<1	3.30**	<1	<1	<1	2.93
Bender-Gestalt I - Match.	1.50	<1	<1	<1	1.61	1.04	1.09	2.62	<1
Bender-Gestalt II - Mem.	<1	1.92	<1	<1	<1	<1	<1	<1	2.17
Bender-Gestalt II -Match.	3.57*	1.75	4.07*	<1	2.14	1.04	<1	<1	<1
Sounds-Pic. Ident.	2.17	5.40**	3.45*	<1	2.56*	1.17	1.35	<1	<1
Sounds-Labeling	2.10	2.80	<1	<1	2.43*	1.85	<1	6.69*	6.65*
Words-Repetition	4.50*	5.78**	<1	<1	3.45**	<1	1.16	17.11**	19.46**
Words-Pic. Ident.	5.06**	<1	2.68	2.39	<1	1.02	1.10	<1	52.31**
Phonemes	<1	2.74	8.49**	<1	<1	2.34*	<1	2.51	22.75**
Word Pair Disc.	7.20**	2.66	2.48	2.30	3.71**	1.87	1.12	<1	45.17**
Wepman	2.11	3.21*	1.12	<1	1.18	<1	<1	<1	4.13*
CNMT-Total	<1	4.70*	<1	<1	<1	<1	<1	<1	4.29*
Memory-Sounds-Recall	1.16	4.59*	1.03	1.32	2.52*	<1	1.54	1.67	3.16
Memory-Sounds-Recog.	<1	1.95	4.36*	<1	1.64	<1	<1	<1	<1
Memory-Words-Recall	1.52	3.01	1.16	<1	1.55	<1	<1	<1	<1
Memory-Words-Recog.	<1	<1	2,51	2.28	<1	<1	<1	1.64	9.60**
CPT Reac. Time-101-2000 msec.	<1	1.68	5.29**	<1	1.81	<1	<1	4.64*	27.21**
CPT Reac. Time-101-1000 msec.	<1	1.12	5.36**	1.11	2.10	<1	<1	3.24	24.07**
CPT # Resp. - 101-2000 msec.	2.07	5.93**	<1	<1	3.40**	1.17	1.07	<1	22.65**
CPT # Resp. - 101-1000 msec.	<1	10.91**	3.16*	<1	1.42	1.77	<1	<1	32.94**
df	2	2	3	4	6	6	12	1	1

* Significant at .05 level
** Significant at .01 level

.Appendix H

F Ratios for the Treatment by Time by Ethnic Group Analysis of Covariance

	Main Effects			Interaction Effects				Covariates	
Dependent Variable	Treatment	Time	Ethnic Group	Treatment x Time	Treatment x Ethnic Group	Time x Ethnic Group	Treatment x Time x Ethnic Group	I.Q.	Pre-test
1. Gates PPR	<1	24.21**	2.09	1.67	2.66	<1	<1	1.58	2.94
2. Gates Oral Reading	10.06**	33.14**	9.13**	<1	4.60**	<1	<1	7.40**	59.91**
3. Gates Sight Vocabulary	5.25**	45.54**	8.32**	<1	4.55**	<1	<1	9.07**	71.16**
4. Roswell-Chall Sounds	16.53**	1.92	18.56**	1.17	<1	<1	<1	<1	46.57**
5. Roswell-Chall Words	1.04	15.65**	5.09*	<1	2.15	<1	<1	10.49**	8.62**
6. Roswell-Chall Syllables	2.64	27.78**	<1	1.14	2.37	<1	<1	14.90**	9.68**
7. Roswell-Chall Total Score	7.75**	11.32**	18.86**	1.19	2.17	<1	<1	2.72	50.74**
8. Bender Gestalt I-Mem.	<1	2.52	17.29**	<1	1.89	2.83	1.16	<1	2.13
9. Bender Gestalt I-Match.	1.32	2.76	5.63*	<1	2.17	<1	<1	3.01	<1
10. Bender Gestalt II-Mem.	<1	2.13	4.83*	<1	<1	<1	<1	<1	<1
11. Bender Gestalt II-Match.	<1	1.61	5.19*	<1	<1	<1	<1	<1	<1
12. Sounds-Picture Ident.	1.30	3.54*	1.36	<1	<1	<1	<1	<1	3.66
13. Sounds-Labeling	2.27	2.00	2.90	<1	2.19	1.44	1.12	<1	18.52**
14. Words-Repetition	2.23	9.94**	<1	1.61	<1	<1	<1	3.68	37.15**
15. Words-Picture Ident.	<1	2.01	2.56	<1	<1	<1	<1	8.59**	6.20*
16. Phonemes	<1	5.14**	2.59	<1	<1	1.25	<1	2.20	20.70**
17. Word Pair Disc.	1.04	9.61**	3.06	1.83	<1	1.43	1.62	1.26	40.99**
18. Wepman	3.15*	7.13**	4.76*	<1	1.56	<1	<1	6.47*	<1
19. CNMT-Total	<1	9.03**	1.95	<1	<1	1.23	<1	<1	8.79**
20. Memory-Sounds-Recall.	1.17	3.14*	<1	<1	1.96	1.11	1.04	<1	<1
21. Memory-Sounds-Recog.	<1	1.43	1.36	1.23	2.83*	2.97	<1	2.33	<1
22. Memory-Words-Recall.	<1	3.42*	1.64	<1	1.32	<1	<1	<1	<1
23. Memory-Words-Recog.	1.99	<1	<1	1.19	1.36	<1	2.48*	7.46**	27.85**
24. CPT Reac. Time 101-2000 msec.	<1	<1	<1	<1	1.51	<1	<1	<1	23.95**
25. CPT Reac. Time 101-1000 msec.	<1	<1	<1	<1	1.69	<1	<1	<1	22.20**
26. CPT #Resp. 101-2000 msec.	<1	4.53*	<1	<1	1.87	1.02	1.53	1.45	39.10**
27. CPT #Resp. 101-1000 msec.	<1	9.07**	2.16	<1	2.40	1.09	1.48	9.02**	55.45**
df	3	2	1	6	3	2	6	1	1

*Significant at .05 level
**Significant at .01 level

Appendix I-1

Results of the Treatment Multiple Comparisons for the Treatment by Time by Tutor Analysis

	Treatment		
Dependent Variable	Reading-Play Versus Reading -Play	Reading-Auditory Versus Auditory-Play	Reading-Play Versus Auditory-Play
Gates Oral Reading	1.22	0.10	1.35
Gates Sight Vocabulary	0.79	-0.12[a.]	0.70
Bender-Gestalt II-Match.	-0.14	0.92	0.79
Words-Repetition	-0.14	-0.81	-0.98
Words-Picture Ident.	-0.08	0.16	0.07
Word Pair Discrimination	-0.46	0.47	0.01

*Significant at .10 level

a. Minus sign indicates that the latter mentioned treatment had a higher score than the former treatment.

Appendix I-2

Results of the Time Multiple Comparisons for the Treatment by Time by Tutor Analysis

	Time		
Dependent Variable	Post-Test I Versus Post-Test II	Post-Test II Versus Post-Test III	Post-Test I Versus Post-Test III
Gates PPR	0.84	0.71	1.53
Gates Oral Reading	0.24	1.66	1.83*
Gates Sight Vocabulary	0.38	1.90*	2.21**
Roswell-Chall Words	0.29	1.38	1.61
Roswell-Chall Syllables	0.47	1.44	1.86*
Roswell-Chall Total Score	-0.21[a]	0.96	0.71
Sounds-Picture Ident.	0.68	0.20	0.87
Words-Repetition	0.72	0.07	0.78
Wepman	0.05	0.76	0.78
CNMT-Total	0.19	0.74	0.90
Memory-Sounds-Recall	0.50	0.81	1.28
CPT #Resp. 101-2000 msec.	0.59	0.42	0.99
CPT #Resp. 101-1000 msec.	0.99	0.39	1.37

*Significant at .10 level

**Significant at .05 level

[a] Minus sign indicates that the earlier post-test score was higher than the later post-test score.

Results of the Tutor Multiple Comparisons for the Treatment by Time by Tutor Analysis
Tutor

Dependent Variable	Tutor 1 Versus Tutor 2	Tutor 1 Versus Tutor 3	Tutor 1 Versus Tutor 4	Tutor 2 Versus Tutor 3	Tutor 2 Versus Tutor 4	Tutor 3 Versus Tutor 4
Gates Oral Reading	1.06	-0.22[a]	0.12	-1.39	-1.00	0.38
Roswell-Chall Sounds	0.43	-0.88	0.49	-1.37	0.05	1.51
Roswell-Chall Words	1.22	-1.57	0.71	-2.90*	-0.61	2.47*
Roswell-Chall Total Score	-0.20	-1.00	0.73	-1.89	-0.09	1.91
Bender-Gestalt II Match.	0.87	-0.17	0.23	-1.14	-0.69	0.45
Sounds-Picture Ident.	-0.33	0.84	-0.17	1.21	0.17	-0.10
Phonemes	-0.17	-1.64	0.13	-1.47	0.31	1.93
Memory-Sounds-Recognition	-0.71	-0.39	0.14	0.39	0.89	0.57
CPT Reac. Time 101-2000 msec.	-0.19	-0.29	0.93	-0.08	1.13	1.35
CPT Reac. Time 101-1000 msec.	-0.27	-0.12	0.95	0.18	1.24	1.19
CPT #Resp. 101-1000 msec.	-0.03	0.93	-0.34	0.96	-0.32	-1.38

*Significant at .10 level

[a] Minus sign indicates that the children of the latter mentioned tutor scored higher than the children of the former tutor.

Appendix J-1

Results of the Treatment Multiple Comparisons for the Treatment by Time by Ethnic Group Analysis

	Treatment					
Dependent Variable	Reading-Play Versus Reading-Auditory	Reading-Play Versus Auditory-Play	Reading-Play Versus Control	Reading-Auditory Versus Auditory-Play	Reading-Auditory Versus Control	Auditory-Play Versus Control
Gates Oral Reading	0.62	0.36	0.89	-0.29 a.	0.24	0.56
Gates Sight Vocabulary	0.26	0.12	0.61	-0.16	0.34	0.52
Roswell-Chall Sounds	-0.38	-0.20	0.72	0.20	1.12	0.97
Roswell-Chall Total Score	-0.13	-0.09	0.59	0.04	0.72	0.71
Wepman	-0.30	-0.04	-0.46	0.27	-0.15	-0.44

*Significant at .10 level

a. Minus score indicates that the latter mentioned treatment had a higher score than the former treatment.

Appendix J-2

Results of the Time Multiple Comparisons for the Treatment by Time by Ethnic Group Analysis

		Time	
Dependent Variable	Post-Test I Versus Post-Test II	Post-Test II Versus Post-Test III	Post-Test I Versus Post-Test III
Gates PPR	0.45	0.75	1.17
Gates Oral Reading	0.11	1.24	1.29
Gates Sight Vocabulary	0.29	1.32	1.54
Roswell-Chall Words	0.14	0.81	0.91
Roswell-Chall Syllables	0.08	1.14	1.16
Roswell-Chall Total Score	-0.09[a]	0.79	0.66
Sounds-Picture Ident.	0.39	-0.02	0.38
Words-Repetition	0.61	0.09	0.70
Phonemes	0.30	0.22	0.51
Word Pair-Discrimination	0.60	0.10	0.70
Wepman	0.07	0.56	0.60
CNMT-Total	0.26	0.37	0.62
Memory-Sounds-Recall	0.19	0.34	0.51
Memory-Words-Recall	0.30	0.21	0.50
CPT #Resp. 101-2000 msec.	0.33	0.23	0.55
CPT #Resp. 101-1000 msec.	0.48	0.29	0.76

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*Significant at the .10 level

[a] Minus sign indicates that the earlier post-test score was higher than the later post-test score.

Appendix J-3

Results of the Ethnic Group Multiple Comparisons for the Treatment by Time by Ethnic Group Analysis

Dependent Variable	Puerto Rican Group Versus Negro Group
Gates Oral Reading	0.67
Gates Sight Vocabulary	0.53
Roswell-Chall Sounds	0.96
Roswell-Chall Words	0.48
Roswell-Chall Total Score	0.96
Bender-Gestalt I-Mem.	0.73
Bender-Gestalt I-Match.	0.46
Bender-Gestalt II-Mem.	0.47
Bender-Gestalt II-Match.	0.52
Wepman	-0.43[a.]

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[*] Significant at the .10 level

[a.] Minus sign indicates that the Negro children had a higher score than the Puerto Rican children.

Cell Interaction Comparison Statistic for the Treatment by Time by Tutor Analysis

	Treatment by Tutor											
	Reading-Play by Tutor:				Reading-Auditory by Tutor:				Auditory-Play by Tutor:			
Dependent Variable	#1	#2	#3	#4	#1	#2	#3	#4	#1	#2	#3	#4
1. Gates Oral Reading	4.08**	0.68	-4.93***	4.20**	-1.21	2.49	-0.26	-1.89	-1.84	-3.24	7.63***	-3.56*
2. Gates Sight Vocabulary	5.89***	-3.05	-2.98	3.19	-2.75	3.28	-0.74	-1.63	-3.33	-2.17	7.37***	-2.16
3. Roswell-Chall Words	6.91***	0.36	-4.67***	1.12	-4.13**	0.52	1.64	-1.76	-5.68***	-1.77	7.51***	1.47
4. Roswell-Chall Syllables	6.90***	-6.92***	-0.72	5.65***	-3.77**	5.93***	-3.17	-1.97	-4.92***	0.20	7.43***	-5.05***
5. Bender-Gestalt I-Match.	-3.15	8.23***	0.89	-7.98***	0.28	-1.87	-2.03	7.86***	3.33	-4.86***	2.65	0.75
6. Sounds-Picture Ident.	-7.34***	5.45***	2.00	-2.95	8.46***	-3.64*	-1.07	2.99	0.09	0.67	-0.77	0.25
7. Sounds-Labeling	5.43***	0.61	-0.31	-5.43***	-0.13	0.51	-4.53***	8.90***	-3.36*	-1.32	9.15***	-5.36***
8. Words-Repetition	0.22	-3.90**	1.08	2.72	-2.52	2.84	-0.73	-2.84	2.21	-1.20	-0.40	0.63
9. Word Pair Disc.	0.02	8.41***	-3.35*	-6.94***	-2.70	-4.02**	2.43	4.43***	1.73	-2.92	0.91	2.51
10. Memory-Sounds-Recall	2.08	4.72***	-0.22	-5.89***	-5.58***	-0.13	-1.89	6.43***	2.10	-4.14**	4.46***	-1.45
11. CPT # Resp. 101-2000 msec.	0.32	6.83***	-6.02***	3.87**	-1.18	1.35	1.90	-5.55***	0.32	-9.16***	6.34***	2.97

	Time by Tutor											
	Post-test I by Tutor:				Post-test II by Tutor:				Post-test III by Tutor:			
Dependent Variable	#1	#2	#3	#4	#1	#2	#3	#4	#1	#2	#3	#4
12. Phonemes	-8.17***	6.09***	-3.78**	5.79***	2.41	-14.03***	1.22	8.63***	5.53***	7.91***	2.11	-14.02***

*Significant at .10 level
**Significant at .05 level
***Significant at .01 level

Appendix L

Cell Interaction Comparison Statistic for the Treatment by Time by Ethnic Group Analysis

Dependent Variable	Treatment x Race							
	R-P[a] x P R	R-P x Negro	R-A x P R	R-A x Negro	A-P x P R	A-P x Negro	Control x P R	Control x Negro
Reading Scores								
Gates Oral Reading	-7.73*	7.73*	1.75	-1.75	7.37*	-7.37*	-5.09*	5.09*
Gates Sight Vocabulary	-8.64*	8.64*	-0.38	0.38	8.80*	-8.80*	-2.35	2.35
Auditory Scores								
Memory-Sounds-Recognition	9.80*	-9.80*	-6.76*	6.76*	-0.07	0.07	0.25	-0.25

a. R-P = Reading-Play
R-A = Reading-Auditory
A-P = Auditory-Play
P R = Puerto Rican

* Significant at .01 level

Appendix M

Means for Each of the 27 Variables for Each Treatment Group at Each Time of Testing

	Pre-test				Post-test I				Post-test II				Post-test III			
Dependent Variable	R-P*	R-A	A-P	C	R-P	R-A	A-P	C	R-P	R-A	A-P	C	R-P	R-A	A-P	C
1. Gates PPR	2.2	2.2	2.2	2.2	2.9	2.8	2.7	2.8	3.1	3.3	3.0	3.2	3.3	3.8	3.4	4.0
2. Gates Oral Rdg.	3.3	4.0	4.1	4.1	15.5	11.2	11.2	9.1	14.7	14.0	11.3	11.3	20.9	20.9	16.5	18.8
3. Gates Sgt. Voc.	6.4	5.6	7.2	6.3	13.9	12.7	12.5	10.7	14.8	14.8	12.9	12.9	22.5	20.6	18.2	20.3
4. Roswell-Chall Sounds	13.7	12.2	14.8	13.8	25.4	28.7	28.3	18.5	23.9	26.4	22.3	19.5	24.5	27.9	23.2	21.1
5. Roswell-Chall Words	0.9	0.9	0.5	0.5	6.0	4.3	2.4	3.0	5.0	5.3	3.0	3.9	7.5	8.0	6.1	8.4
6. Roswell-Chall Syllables	0.9	1.0	1.2	1.7	5.4	4.6	3.7	3.3	4.6	6.4	3.9	3.6	8.5	8.6	7.2	9.1
7. Roswell-Chall Total Score	15.5	14.1	16.5	16.0	36.8	37.6	34.4	24.8	33.5	38.1	29.2	27.0	40.5	44.5	36.6	38.6
8. Bender-Gestalt I-Memory	5.1	6.1	5.0	5.3	5.9	6.9	5.8	6.7	6.4	7.1	6.3	6.9	6.9	7.2	7.0	6.7
9. Bender-Gestalt I-Matching	6.7	7.3	7.2	6.6	7.1	7.5	6.5	7.3	7.2	7.5	6.8	7.7	7.5	7.8	7.1	8.0
10. Bender-Gestalt II-Memory	8.0	8.7	8.0	8.0	8.4	8.5	8.2	8.7	8.4	8.7	8.6	8.8	8.8	9.0	8.4	8.8
11. Bender-Gestalt II-Matching	8.6	8.7	8.4	8.5	8.7	8.8	8.3	8.9	8.8	8.9	8.5	8.5	9.0	9.0	8.7	9.0
12. Sounds-Pic. Ident.	17.4	17.9	17.4	17.6	18.2	18.5	17.9	18.0	18.4	18.9	18.2	19.1	18.7	18.7	18.6	19.0
13. Sounds-Label.	14.4	15.9	14.5	14.8	15.5	16.5	15.5	16.3	15.7	16.7	16.1	16.3	15.9	17.5	16.2	16.9
14. Words-Repet.	25.8	25.1	23.8	24.2	25.0	25.7	26.0	23.7	26.5	27.2	26.7	26.1	26.8	27.2	26.3	27.7
15. Words-Pic. Idt.	16.1	16.3	16.3	15.6	17.4	17.7	16.8	16.9	17.9	18.2	17.3	17.5	17.8	18.0	17.3	18.0
16. Phonemes	36.9	37.0	36.4	36.4	37.0	36.4	37.0	36.6	37.1	39.2	39.4	38.9	39.8	40.4	37.8	40.4
17. Word Pair Disc.	27.6	30.9	27.8	26.3	32.4	36.5	31.0	29.9	35.4	37.0	33.3	35.1	34.2	37.7	35.8	36.9
18. Wepman	19.4	19.9	19.6	21.7	24.7	25.5	24.3	26.1	24.5	25.8	25.2	26.6	25.4	27.0	26.9	27.9
19. CNMT-Total	36.4	38.3	36.4	38.7	41.1	43.9	43.6	42.9	46.4	45.7	47.3	47.3	45.9	46.2	47.8	49.3
20. Memory-Sounds Recall	5.3	5.7	5.2	4.9	5.9	7.0	5.8	5.2	6.6	6.2	6.5	6.8	6.6	7.8	7.5	6.8
21. Memory-Sounds Recognition	23.1	24.3	24.2	22.3	24.1	25.0	24.3	24.2	23.8	24.5	23.0	25.0	25.1	24.9	25.0	24.2
22. Memory-Words Recall	3.4	4.0	3.2	2.7	3.3	4.6	2.9	4.1	4.1	4.5	4.7	4.1	5.1	5.3	4.6	4.4
23. Memory-Words Recog.	28.5	28.7	28.0	25.3	27.5	28.1	29.0	28.7	29.5	26.5	29.1	27.5	28.0	29.1	30.6	28.6
24. CPT Reac. Time 101-2000 msec.	650.9	640.3	643.2	658.9	571.1	589.5	579.5	535.5	566.2	525.4	531.3	589.0	545.6	534.8	562.4	559.8
25. 101-1000 msec.	620.4	606.9	602.5	618.3	547.7	568.0	565.8	525.9	557.8	517.8	520.0	577.3	537.5	530.3	50.2	554.3
26. CPT # Resp. 101-2000 msec.	64.0	66.7	66.4	64.5	72.1	74.1	70.6	70.8	73.9	75.4	74.1	73.4	75.6	76.5	73.8	74.9
27. 101-1000 msec.	55.0	58.5	57.2	55.7	65.2	69.3	65.7	66.4	71.2	72.8	70.5	68.9	72.7	74.6	71.0	71.7
IQ	80.0	83.7	74.2	81.4												

*R-P = Reading-Play   R-A = Reading-Auditory   A-P = Auditory-Play   C = Control

Appendix N

Factor Loadings for the Reading and Auditory Tests

		Factor					
	H^2	1	2	3	4	5	6
1. I.Q.	.34	.27	.05	.11	-.43	-.12	-.22
2. Gates PPR	.25	.04	.10	-.10	.03	-.08	-.47
3. Gates Oral Reading	.61	-.23	.67	.06	-.19	.03	-.26
4. Gates Sight Vocabulary	.52	-.17	.66	.01	-.09	-.02	-.20
5. Roswell-Chall Sounds	.59	.10	.75	.07	-.05	.01	.12
6. Roswell-Chall Words	.34	.07	.51	-.17	.09	-.01	-.19
7. Roswell-Chall Syllables	.43	.02	.65	.04	.10	.00	.05
8. Bender Gestalt I-Mem.	.37	.43	.09	.38	.08	-.05	.15
9. Bender Gestalt I-Match.	.31	.42	.12	.33	.03	.08	.07
10. Bender Gestalt II-Mem.	.60	.76	-.08	.14	-.04	.03	-.04
11. Bender Gestalt II-Match.	.36	.58	-.11	.02	-.02	.01	-.08
12. Sounds-Picture Ident.	.45	.58	-.10	.03	-.22	.14	-.17
13. Sounds-Labeling	.27	.24	.11	-.07	-.36	.25	.04
14. Words-Repetition	.16	.13	-.04	.01	-.65	.03	.16
15. Words-Picture Ident.	.50	.14	.13	-.29	-.57	-.07	-.23
16. Phonemes	.32	-.07	-.06	.12	-.54	.00	.02
17. Word Pair Disc.	.55	.10	.17	-.30	-.65	-.02	.01
18. Wepman	.17	.01	.06	-.33	-.20	-.10	-.09
19. CNMT-Total	.36	-.20	-.06	.10	-.53	.13	.00
20. Memory-Sounds-Recall.	.17	.14	.02	.37	-.07	.11	.00
21. Memory-Sounds-Recog.	.31	.22	-.03	.36	-.24	-.05	-.28
22. Memory-Words-Recall.	.13	-.04	.25	.01	-.08	.14	-.21
23. Memory-Words-Recog.	.23	.07	.07	.01	.03	.05	-.46
24. CPT Reac. Time 101-2000 msec.	.35	.00	.15	.06	.01	-.49	-.28
25. CPT # Resp. 101-2000 msec.	.72	.19	.28	.31	-.10	.67	-.23
26. CPT # Resp. 101-1000 msec.	.84	.04	.08	.21	-.05	.88	-.07
Total Variance		.15	.17	.06	.18	.07	.11
Common Variance		.19	.23	.10	.22	.16	.10

Appendix O

Evaluation of Child's Non-Measurable Progress

I Motivation

	Excellent	Good	Moderate	Fair	Poor
Attentivity.					
Self-involvement in ongoing activities.					

II Reading Skills

	Has Skills	Can Apply Them In Reading	Does Apply Them
A. Word Analysis			
1. Knowledge of consonant sounds.			
2. Knowledge of vowel sounds			
3. Knowledge of consonant combinations.			
4. Knows basic sight vocabulary words.			
5. Has good phrasing in oral reading.			
B. Comprehension			
1. Understands meanings of words read.			
2. Can read for details			
3. Can read for inference.			
4. Can follow directions from reading.			

III Auditory

	Has Skills	Can Apply Them In Reading	Does Apply Them
A. Recognizes consonant sounds.			
B. Recognizes vowel sounds.			
C. Can discriminate among sounds.			
1. Beginning sounds.			
2. Middle sounds.			
3. Ending sounds.			
D. Can remember details and sequence.			

Appendix P

Behavior Rating Scales and Personality Checklist

TASK ORIENTATION

A. General Attitude towards this Situation:

1. Eager........................
2. Interested..................
3. Indifferent (neutral).......
4. Reluctant...................
5. Resistant...................

B. Reaction to Specific Activities or Tasks:

1. Interested in everything (self motivated)..............
2. Worked with encouragement (capable of being motivated)..
3. Selectively responsive to tasks.........................
4. Infrequently responsive.......
5. Non-responsive................

WORK HABITS

C. Concentrates on Task:

1. Almost always................
2. Usually.....................
3. Sometimes...................
4. Seldom......................
5. Very seldom or never........

D. Works Independently:

1. Almost always.................
2. Usually.......................
3. Sometimes.....................
4. Seldom........................
5. Very seldom or never..........

GROUP INTERACTION

E. Orientation to Group Work:

1. Always cooperative..........
2. Generally cooperative.......
3. Erratic.....................
4. Generally disruptive........
5. Almost always disruptive....

F. Competes with Other Group Members:

1. Almost always.................
2. Usually.......................
3. Sometimes.....................
4. Seldom........................
5. Very seldom or never..........

G. Responds to Distracting Behavior:

1. Very seldom or never........
2. Seldom......................
3. Sometimes...................
4. Usually.....................
5. Almost always...............

Appendix P (continued)

Behavior Rating Scales and Personality Checklist

PERSONALITY CHECKLIST

Self-confident (willing to try when not sure of skill)..............
Cooperative (in individual situation)...........................
Compliant...
Withdrawn...
Seeks nurturance from tutor.................................
Fearful...
Domineering...
Resents distraction.......................................
Low frustration level......................................
Attention seeker..
Verbally hostile..
Physically aggressive.....................................
Negative..

Appendix 2

Teacher Attitude Scale

1. Please rate the treatment groups in the first study as to how much you enjoyed teaching the particular treatment considering only the materials and techniques involved in the teaching of each type of treatment. Give 1 to the treatment you most enjoyed teaching and 3 to the treatment you least enjoyed teaching.

    Reading-Play ______

    Reading-Auditory ______

    Auditory-Play ______

2. Please now rate the groups as to how much you enjoyed teaching them in terms of the children's personality. Again, 1 means you enjoyed it the most and 3 the least. The ratings may or may not coincide with the above ratings.

    If you had 2 groups of children for a type of treatmnt, give a combined score to the 2 groups. That is, consider the 2 groups of children as one.

    Reading-Play ______

    Reading-Auditory ______

    Auditory-Play ______

3. Now rate the groups considering both of the above factors--the techniques and materials involved as well as the children's personality.

    Reading-Play ______

    Reading-Auditory ______

    Auditory-Play ______

4. Please put a check mark on the appropriate place on the scales below. Put the mark on the line above one of the numbers, not in between the numbers.*

As in question 1, this refers to the materials and methods used in each treatment.

Reading-Play
1 2 3 4 5

Reading-Auditory
1 2 3 4 5

Auditory-Play
1 2 3 4 5

5. As in question 2, this is to indicate how much you enjoyed teaching these particular children.

Reading-Play
1 2 3 4 5

Reading-Auditory
1 2 3 4 5

Auditory-Play
1 2 3 4 5

6. As in question 3, this is to be rated with reference to both of the above factors, the materials and methods used and the children's personality.

Reading-Play
1 2 3 4 5

Reading-Auditory
1 2 3 4 5

Auditory-Play
1 2 3 4 5

* Please note that:

1 = very much enjoyed teaching them

3 = indifferent

5 = did not enjoy teaching them

Appendix R

Auditory Skills Taught in Each Lesson to One Group

Study II

Type of Activity	Sessions																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Introduction	●																													
Environmental Sounds																														
a. Recognition	●																													
b. Similar & Diff.	●																													
Oral Commissions	●	●	●	●	●	●	●	●	●	●	●											●			●		●		●	
Rhyming			●		●	●	●	●	●																	●	●	●		●
Words (Recog. + Recall-Discr.-Repet.)						●	●			●	●		●				●				●									
Letter Sounds (Syllab.)																									●			●		
Initial Consonants																														
1. Recognition		●	●	●	●	●	●	●	●	●				●	●		●					●	●	●						
2. Repetition		●	●	●	●	●	●	●	●	●				●	●	●	●					●	●	●						
3. Discrimination		●	●	●	●	●	●	●	●	●	●			●	●	●	●					●	●	●						
Final Consonants																														
1. Recognition					●	●	●	●															●	●					●	
2. Repetition					●	●	●	●															●	●					●	
3. Discrimination					●	●	●	●															●	●					●	
Middle Consonants																														
1. Recognition					●	●	●																●	●						
2. Repetition					●	●	●																●	●						
3. Discrimination					●	●	●																●	●						
Vowels-Long																														
1. Recognition																●	●						●	●						●
2. Repetition																●	●						●	●						●
3. Discrimination																●	●						●	●						●
Vowels-Short																														
1. Recognition											●	●	●	●	●	●	●		●		●	●		●	●	●	●	●	●	●
2. Repetition											●	●	●	●	●	●	●		●		●	●		●	●	●	●	●	●	●
3. Discrimination													●	●	●	●	●	●	●		●	●		●	●	●	●	●	●	●
Consonant Blends																														
1. Recognition											●	●	●			●		●	●		●	●		●	●		●	●	●	●
2. Repetition											●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●
3. Discrimination														●		●		●	●		●	●		●	●		●	●	●	●
Telling Stories			●		●				●										●											
Memory							●	●				●	●											●						
1. Details								●	●										●											
2. Sequence							●	●	●										●						●	●				

Appendix S

Pre-test and Post-test Means for Each of the 27 Variables for Each Treatment Group

	Pre-test				Post-test			
Dependent Variable	R-P[a]	R-A	A-P	C	R-P	R-A	A-P	C
1. Gates PPR	2.3	2.2	2.3	2.3	2.8	2.7	2.6	2.6
2. Gates Oral Reading	2.7	3.1	2.9	3.9	12.2	11.7	9.3	6.0
3. Gates Sight Vocab.	6.3	6.2	7.3	6.8	13.5	11.6	11.5	10.4
4. Roswell-Chall Sounds	8.6	5.9	10.3	11.2	27.7	19.4	27.1	13.4
5. Roswell-Chall Words	0.4	0.8	0.9	0.7	3.9	2.7	3.8	1.3
6. Roswell-Chall Syll.	0.4	0.2	1.1	0.7	3.8	3.0	3.6	2.3
7. Roswell-Chall Total	9.4	6.9	12.3	12.6	35.3	25.1	34.4	17.1
8. Bender-Gestalt I-Mem.	4.5	5.0	4.4	4.8	5.9	5.8	5.0	5.6
9. Bender-Gestalt I-Match.	6.5	7.1	6.4	6.4	7.3	6.7	6.3	6.7
10. Bender-Gestalt II-Mem.	7.8	7.9	7.1	6.9	8.8	8.3	8.0	7.7
11. Bender-Gestalt II-Match.	8.5	8.2	8.3	8.1	8.6	8.8	8.5	7.8
12. Sounds-Pic. Ident.	18.5	16.1	16.9	16.4	18.6	18.1	18.0	18.1
13. Sounds-Labeling	14.6	14.6	16.1	14.2	16.9	16.0	17.3	16.0
14. Words-Repetition	25.0	22.9	24.5	23.0	25.3	25.3	26.1	25.3
15. Words-Pic. Ident.	16.9	14.8	16.6	16.4	17.4	16.2	16.9	16.9
16. Phonemes	35.4	37.3	36.9	37.4	38.6	38.8	37.0	38.4
17. Word Pair Disc.	30.9	24.7	29.0	27.9	31.1	31.3	32.9	32.2
18. Wepman	22.5	18.3	22.4	21.6	25.3	24.8	24.5	24.6
19. CNMT-Total	39.9	35.2	37.3	32.8	46.6	41.6	40.5	41.2
20. Mem.-Sounds-Recall	4.4	3.9	4.3	4.8	5.0	5.9	7.9	5.9
21. Mem.-Sounds-Recog.	24.0	22.3	21.1	24.0	24.3	23.1	23.4	23.2
22. Mem.-Words-Recall	3.3	2.3	2.6	2.3	4.8	3.3	2.9	3.4
23. Mem.-Words-Recog.	32.1	30.7	25.9	29.6	30.5	31.9	24.8	29.3
24. CPT Reac. Time-101-2000 msec.	678.0	679.4	681.0	652.2	668.1	625.8	648.0	628.9
25. CPT Reac. Time-101-1000 msec.	620.6	623.8	640.8	604.8	622.9	594.1	613.5	585.2
26. CPT #Resp.-101-2000 msec.	62.8	54.4	58.1	57.7	58.5	57.3	58.8	58.8
27. CPT #Resp.-101-1000 msec.	53.5	47.1	51.3	49.9	51.6	51.0	53.8	52.0
IQ	83.0	77.2	75.6	81.3				

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[a] R-P = Reading-Play, R-A = Reading-Auditory, A-P = Auditory-Play, C = Control